

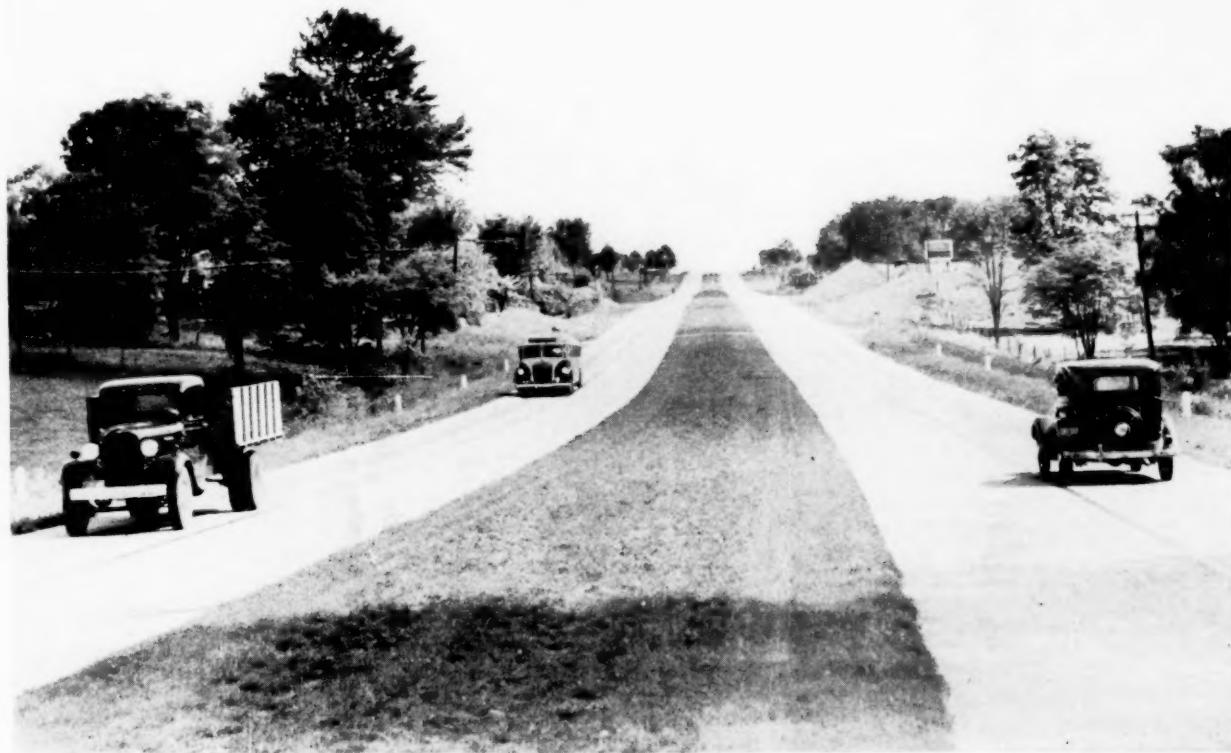
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IN HIGHWAY TRAVEL IT'S BUSINESS 2 TO 1

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TRANSPORTATION

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D. M. BEACH, *Editor*

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The reports of research published in this magazine are necessarily qualified by the conditions of the tests from which the data are obtained. Whenever it is deemed possible to do so, generalizations are drawn from the results of the tests; and, unless this is done, the conclusions formulated must be considered as specifically pertinent only to described conditions.

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Because of the necessarily limited edition of this publication it is impossible to distribute it free to any person or institution other than State and county officials actually engaged in planning or constructing public highways, instructors in highway engineering, and periodicals upon an exchange basis. At the present time additions to the free mailing list can be made only as vacancies occur. Those desiring to obtain PUBLIC ROADS can do so by sending \$1 per year (foreign subscription \$1.50), or 10 cents per single copy, to the Superintendent of Documents, United States Government Printing Office, Washington, D. C.

SOME CHARACTERISTICS OF MOTOR-VEHICLE TRAVEL

BY THE DIVISION OF CONTROL, PUBLIC ROADS ADMINISTRATION

Reported by ROBERT H. PADDOCK, Highway Engineer-Economist

APPROXIMATELY 65 percent of all motor-vehicle travel in the United States is for "business" purposes, or in connection with such essential activities as earning a living or maintaining the home. Data on this subject were obtained in the road-use studies conducted as a part of the State-wide highway planning surveys that were initiated in 1935.

The road-use studies are integral parts of the highway planning surveys that have been undertaken in all States and the District of Columbia. Information regarding road use was obtained by means of a large number of personal interviews with motor-vehicle owners and drivers. These interviews were selected and carefully analyzed to provide a proper representation of each geographical division of a State, of each group of governmental jurisdictions within similar population ranges, of various occupations, and of vehicles in operation according to types and ages.

Some of the preliminary results of the studies, relating particularly to use of the various highway systems and length of trips, have already been published.¹ The application of the road-use survey methods to other problems has also been studied² and considerable statistical review and analysis of the road-use methods and data have been made.³

Two general methods of obtaining the information were used. In most States a group of full-time, trained personnel interviewed motor-vehicle owners to obtain the desired information. In other States the data were obtained by high school students from their parents and friends who owned motor vehicles. The students received instruction regarding the data to be obtained from a small group of full-time instructors who visited all the high schools in the State. Figure 1 shows the methods by which road-use information has been

There is much current interest in the purpose of travel on the Nation's highway and street systems. The accompanying article is timely both because of existing war-impelled restrictions on the production and sale of motor vehicles and tires for private use and because of the recurring threat of motor fuel rationing.

Road-use studies of the highway planning surveys in 35 States indicate that 58.6 percent of passenger-car travel in those States was for business purposes and that nearly all truck travel was for business or commercial purposes. Thus, during the period here reported, 65 percent of the annual travel of all motor vehicles was for business purposes.

The article also presents an estimate of total vehicle-miles traveled during 1940 and, on the assumption that no appreciable change occurred between the study years (usually 1936-37) and 1940 in the ratio of business to social-recreational travel, the vehicle-mile total for 1940 by type of vehicle is given in terms of the estimated extent of driving in connection with the two major travel purposes.

The age of a passenger car is shown to exert an influence upon the character of its use to such an extent that, although the number of round trips made annually averages 619 for vehicles 1 year old and 417 for vehicles more than 8 years old, the percentage of total travel for business purposes was 55 percent for the former and 61 percent for the latter. Since a relationship has previously been shown to exist between situs of vehicle ownership and age of vehicle, the greater percentage use of the rural-owned vehicle for business purposes is a corollary.

obtained in the various States. Tabulation and analysis of the data have not yet been completed for Connecticut, Delaware, Georgia, Maine, Massachusetts, Mississippi, New Jersey, Rhode Island, and Tennessee. The Pennsylvania survey did not provide for a classification of business and pleasure travel.

The primary purpose of the road-use surveys was to obtain information that would make it possible to estimate:

1. The total amount of travel on the various highway systems in a given area or in the State; and
2. The amount of travel performed on the various highway systems in the State by vehicle owners residing in the several governmental jurisdictions.

On the basis of these estimates it would be possible to compare the travel benefits received by the various population groups of the State with their respective highway-user tax contributions.

TRAVEL DATA DIVIDED INTO BUSINESS AND PLEASURE CLASSIFICATIONS

However, in addition to such basic data it was possible to obtain considerable supplemental information from the road-use interviews. The classification of travel into business and pleasure purposes was one type of supplemental information. Figure 2 is a reproduction of the front of the Connecticut interview form and shows how the data were originally entered on each interview so that the separation into business and pleasure travel could be made in the office analyses. In the initial surveys only two classifications were used—business and pleasure. Subsequently, it was believed that the pleasure travel might be more properly classified as recreational and social travel and this separation is made in the Connecticut and other recent surveys.

Generally the classification of travel into business and pleasure purposes was applied only to the analysis of passenger-car travel. For comparative purposes in this study the travel of all trucks has been assumed to be entirely for business purposes. It is known that a small percentage of truck travel is for purposes other than business, but this is usually limited to farmers' trucks that are often used as general utility vehicles. In a few States where truck travel was also classified

¹ A description of the road-use survey methods is given in Preliminary Results of Road-Use Studies, by Robert H. Paddock and Roe P. Rodgers, PUBLIC ROADS, May 1939.

² The Application of Road-Use Survey Methods in Traffic Origin and Destination Analysis, by T. M. C. Martin and Homer L. Baker, PUBLIC ROADS, May 1941.

³ Road-use studies have been conducted in all but four States and the District of Columbia and are now under way in Delaware. Most of the surveys were made in 1936 and 1937 although several have been made more recently and the New York study was conducted in 1934-35. More than 800,000 usable interviews have been obtained in the several States. Table I shows the number of interviews obtained in each of the States in which the surveys have been conducted.



FIGURE 1.—METHODS BY WHICH ROAD-USE INFORMATION HAS BEEN OBTAINED IN THE VARIOUS STATES.

TABLE 1.—*States in which road-use interviews were obtained*

State	Interviews obtained for—		
	Passenger cars	Trucks	All vehicles
Alabama	14,600	2,989	17,589
Arizona	3,440	2,277	5,717
Arkansas	4,176	1,992	6,168
Colorado	1,892	1,262	3,154
Connecticut	54,194	5,021	59,215
Florida	6,972	3,203	10,175
Georgia	25,912	5,667	31,579
Idaho	2,000	1,000	3,000
Illinois	29,236	10,533	39,769
Indiana	13,567	6,264	19,831
Iowa	8,066	3,314	11,380
Kansas	9,244	3,588	12,832
Kentucky	15,290	2,360	17,650
Louisiana	4,614	2,624	7,238
Maine	14,000	2,800	16,800
Maryland	8,616	2,000	10,616
Massachusetts	20,379	9,830	30,209
Michigan	25,300	6,313	31,613
Minnesota	13,657	7,736	21,393
Mississippi	7,017	1,525	8,542
Missouri	12,445	5,770	18,215
Montana	2,598	1,887	4,485
Nebraska	8,213	5,077	13,290
Nevada	2,244	990	3,234
New Hampshire	2,007	1,039	3,046
New Jersey	63,000	9,000	72,000
New Mexico	2,761	2,463	5,224
New York	20,000	5,000	25,000
North Dakota	2,550	1,004	3,554
Ohio	33,761	9,419	43,180
Oklahoma	10,996	3,743	14,739
Oregon	5,020	2,277	7,297
Pennsylvania	23,600	10,640	34,240
Rhode Island	9,673	2,416	12,089
South Dakota	3,607	1,750	5,357
Tennessee	21,600	2,400	24,000
Texas	71,500	20,500	92,000
Utah	2,186	1,135	3,321
Vermont	1,494	873	2,367
Virginia	6,495	3,241	9,736
Washington	18,828	3,118	21,946
West Virginia	4,265	1,867	6,132
Wisconsin	15,041	7,059	22,100
Wyoming	1,258	803	2,061
Total	627,314	185,769	813,083

as to purpose it was found that the use of trucks for other than business purposes was about 2 to 3 percent of the total truck travel.

Analysis of truck travel according to business or pleasure use was made in 15 States. A summary of the results is given in table 2. For the 15 States, 2.5 percent of truck travel was for other than business purposes. It will be noted that these 15 States include

no highly industrialized or urbanized States such as New York, Pennsylvania, New Jersey, Ohio, Michigan, or Illinois. One of the fifteen States is a Southern State and eight are Western States. In the represented Middle States, where a moderate industrialization and urbanization is combined with agricultural development, the percentage of use for other than business purposes is only 0.7 percent for Indiana and 0.8 percent for Minnesota and Wisconsin.

It is believed that the percentages shown in table 2 are not entirely representative of the country as a whole and the data for the 15 States are not sufficient to provide a basis for estimating percentages for the other States. For the purposes of this study it has been considered practicable to classify all truck travel as having been made for business purposes. It will be noted in table 2 that only in the unincorporated areas for the 15 States reported was there much use of trucks for other purposes. The total in this group for the 15 States was 4.4 percent for pleasure purposes. In the next group, incorporated places having a population of 1,000 or less, the percentage was only 2.1 and in each of the other population groups the percentage was less than 2.0.

In the road-use surveys initiated during 1935 and 1936 travel of passenger cars was classified as follows:

Business use.—Trips to regular business or work, other business trips, hauling milk, farm produce, etc., trips to market, to the railroad or bus station, shopping trips, and taking children to and from school.

Pleasure use.—All other travel such as going to games, week-end vacation trips, hunting, fishing, and holiday trips, going to the theater, dancing or visiting, and Sunday and evening drives.

For surveys initiated in 1937 and in subsequent years the following classification of trips was used:

<i>Business</i>	<i>To theater.</i>
To business or work.	To dances.
Business trips.	Visiting.
Hauling milk, etc.	<i>Recreational</i>
To market.	To games.
To railroad or bus station.	Sunday drives.
Shopping.	Evening drives.
Deliveries.	Week end.
<i>Social</i>	<i>Holiday.</i>
Children to and from school.	Hunting.
To church.	Fishing.

It will be noted that there was no change in the business classification except that "children to and from school" was placed under the "social" classification. Subsequently special studies of this particular item have been made and indicate that less than 2 percent of the total travel is for that purpose and that this change in classification does not affect the general relations existing between business and pleasure travel.

FIFTY-SEVEN PERCENT OF PASSENGER-CAR TRAVEL FOR BUSINESS PURPOSES

Tables 3 and 4 present the general data available from the road-use surveys for the percentage classification of passenger-car travel into business and pleasure purposes by States and by population groups. The classification of travel by population groups refers to the travel performed by motor-vehicle owners resident in the several population groupings and does not refer to the travel which occurred on the streets of those places. Table 3 shows the percentages of travel by residents of 35 States in the respective States of residence, while table 4 shows the percentages of travel in all States by residents of

SUGGESTED TYPES OF TRIPS		STATE OF CONNECTICUT STATE HIGHWAY DEPARTMENT STATE-WIDE HIGHWAY PLANNING SURVEY IN COOPERATION WITH UNITED STATES BUREAU OF PUBLIC ROADS				PRESENT SPEEDOMETER READING _____ TOTAL MILES DRIVEN PAST 12 MONTHS _____ TOTAL MILES DRIVEN LAST 12 MONTHS IN THESE FROM: _____	
BUSINESS	RECREATION	ALL					ACTUAL RECORDS ESTIMATE
TO BUSINESS	TO HOME	TO SCHOOL					<input checked="" type="checkbox"/> <input type="checkbox"/>
TO FARM	WACATION TRIPS	TO GAMES					<input type="checkbox"/> <input checked="" type="checkbox"/>
SHOPPING	TO VISITING	TO MOVIES					<input type="checkbox"/> <input type="checkbox"/>
TO MARKET	EVERYDAY DRIVING	TO SHOPS					<input type="checkbox"/> <input type="checkbox"/>
TO GET MAIL	SUNDAY DRIVING	TO AIRPORT					<input type="checkbox"/> <input type="checkbox"/>
BUSINESS ROUTES	WEATHER ROUTES	TO LODGE					<input type="checkbox"/> <input type="checkbox"/>
DELIVERIES	HUNTING, FISHING						<input type="checkbox"/> <input type="checkbox"/>
(c) OWNERS NAME _____ MAILING ADDRESS _____ CITY, STATE OR BOROUGH _____ CONN		ROAD USE INTERVIEW FORM					
(d) GENERAL DATA BUSINESS ADDRESS _____ CITY, STATE OR BOROUGH _____ CONN							
VEHICLE GARAGED IN _____ CITY, STATE OR BOROUGH _____ CONN							
LOCATE THE OWNER'S HOME ON MAP GIVEN YOU WITH A CIRCLE <input type="radio"/> WRITE OWNER'S NAME ON MAP AND RETURN WITH THIS QUESTIONNAIRE							
PLEASE ANSWER EITHER (c) OR (d) (NOT BOTH)							
IF OWNER LIVES INSIDE CITY LIMITS							
HOW FAR IS HOME FROM CENTER OF CITY? _____ MILES WHAT DIRECTION IS HOME FROM CENTER OF CITY? <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> N <input type="checkbox"/> W <input type="checkbox"/> check one (v) NAME OF NEAREST CROSS STREET _____							
HOW FAR IS HOME FROM CENTER OF TOWN? _____ MILES WHAT DIRECTION IS HOME FROM CENTER OF TOWN? <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> N <input type="checkbox"/> W <input type="checkbox"/> check one (v)							
WHAT IS THE NUMBER OF NEAREST NUMBERED HIGHWAY? _____							
HOW FAR IS HOME FROM THIS HIGHWAY? _____ MILES WHAT DIRECTION IS HOME FROM THIS HIGHWAY? <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> N <input type="checkbox"/> W <input type="checkbox"/> check one (v)							
IF OWNER LIVES OUTSIDE CITY LIMITS							
PASSENGER CAR NAME _____ YEAR OF MODEL _____ AVERAGE MILES PER GALLON OF GAS _____ AMOUNT OF REGISTRATION FEE \$ _____							
NAME _____ YEAR OF MODEL _____ AVERAGE MILES PER GALLON OF GAS _____ AMOUNT OF REGISTRATION FEE \$ _____							
IF TRUCK OR TRACTOR TRUCK, GIVE CARRYING CAPACITY _____ LBS GROSS WEIGHT _____ LBS PRIVATE <input type="checkbox"/> CONTRACT <input type="checkbox"/> COMMERCIAL <input type="checkbox"/> NAME OF CONTRACT OR COMMERCIAL BUSINESS _____							
IF BUS, GIVE NUMBER OF PASSENGERS _____							
DATE OF INTERVIEW _____ NAME OF STUDENT _____ NAME OF SCHOOL _____ TEACHER _____ (Circle name of teacher in charge of class the questionnaire)							
RANGE _____ 1000 _____ 2500 _____ 5000 _____ 7500 _____ 10000 _____ 12500 _____ 15000 _____ 17500 _____ 20000 _____ 22500 _____ 25000 _____ 27500 _____ 30000 _____ 32500 _____ 35000 _____ 37500 _____ 40000 _____ 42500 _____ 45000 _____ 47500 _____ 50000 _____ 52500 _____ 55000 _____ 57500 _____ 60000 _____ 62500 _____ 65000 _____ 67500 _____ 70000 _____ 72500 _____ 75000 _____ 77500 _____ 80000 _____ 82500 _____ 85000 _____ 87500 _____ 90000 _____ 92500 _____ 95000 _____ 97500 _____ 100000 _____ 102500 _____ 105000 _____ 107500 _____ 110000 _____ 112500 _____ 115000 _____ 117500 _____ 120000 _____ 122500 _____ 125000 _____ 127500 _____ 130000 _____ 132500 _____ 135000 _____ 137500 _____ 140000 _____ 142500 _____ 145000 _____ 147500 _____ 150000 _____ 152500 _____ 155000 _____ 157500 _____ 160000 _____ 162500 _____ 165000 _____ 167500 _____ 170000 _____ 172500 _____ 175000 _____ 177500 _____ 180000 _____ 182500 _____ 185000 _____ 187500 _____ 190000 _____ 192500 _____ 195000 _____ 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2390000 _____ 2392500 _____ 2395000 _____ 2397500 _____ 2400000 _____ 2402500 _____ 2405000 _____ 2407500 _____ 2410000 _____ 2412500 _____ 2415000 _____ 2417500 _____ 2420000 _____ 2422500 _____ 2425000 _____ 2427500 _____ 2430000 _____ 2432500 _____ 2435000 _____ 2437500 _____ 2440000 _____ 2442500 _____ 2445000 _____ 2447500 _____ 2450000 _____ 2452500 _____ 2455000 _____ 2457500 _____ 2460000 _____ 2462500 _____ 2465000 _____ 2467500 _____ 2470000 _____ 2472500 _____ 2475000 _____ 2477500 _____ 2480000 _____ 2482500 _____ 2485000 _____ 2487500 _____ 2490000 _____ 2492500 _____ 2495000 _____ 2497500 _____ 2500000 _____ 2502500 _____ 2505000 _____ 2507500 _____ 2510000 _____ 2512500 _____ 2515000 _____ 2517500 _____ 2520000 _____ 2522500 _____ 2525000 _____ 2527500 _____ 2530000 _____ 2532500 _____ 2535000 _____ 2537500 _____ 2540000 _____ 2542500 _____ 2545000 _____ 2547500 _____ 2550000 _____ 2552500 _____ 2555000 _____ 2557500 _____ 2560000 _____ 2562500 _____ 2565000 _____ 2567500 _____ 2570000 _____ 2572500 _____ 2575000 _____ 2577500 _____ 2580000 _____ 2582500 _____ 2585000 _____ 2587500 _____ 2590000 _____ 2592500 _____ 2595000 _____ 2597500 _____ 2600000 _____ 260							

FIGURE 2.—INTERVIEW FORM USED IN CONNECTICUT ROAD-USE STUDY.

TABLE 2.—Classification of the total travel of trucks of 15 States for business and pleasure purposes

State		Distribution of travel by residents of—																All places			
		Unincorporated areas		Incorporated places having a population of—																	
				1,000 or less		1,001 to 2,500		2,501 to 5,000		5,001 to 10,000		10,001 to 25,000		25,001 to 100,000		100,001 or more					
Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—			
Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure		
Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent			
Alabama.....	90.1	9.9	96.5	3.5	96.9	3.1	97.5	2.5	95.4	4.6	97.8	2.2	99.3	0.7	97.9	2.1	94.2	5.8			
Arizona.....	96.0	4.0	96.0	4.0	97.6	2.4	97.7	2.3	99.0	1.0	99.6	.4	99.9	.1	99.8	.2	98.0	2.0			
Indiana.....	98.4	1.6	98.8	1.2	99.4	.6	99.1	.9	99.3	.7	99.7	.3	99.9	.1	99.8	.2	99.3	.7			
Kentucky.....	94.2	5.8	95.6	4.4	96.8	3.2	96.7	3.3	97.2	2.8	91.4	8.6	96.4	3.6	98.1	1.9	95.4	4.6			
Minnesota.....	98.3	1.7	98.9	1.1	99.7	.3	100.0	(1)	98.6	1.4	99.8	.2	99.8	.2	99.8	.2	99.2	.8			
Missouri.....	97.0	3.0	97.6	2.4	97.6	2.4	99.2	.8	99.2	.8	99.3	.7	98.4	1.6	99.2	.8	98.4	1.6			
Nebraska.....	98.7	1.3	99.7	.3	99.7	.3	99.5	.5	99.9	.1	99.9	.1	99.9	.1	99.6	.4	99.5	.5			
Nevada.....	94.6	5.4	96.4	3.6	99.3	.7	99.4	.6	99.5	.5	98.9	1.1	99.6	.4	100.0	(1)	97.4	2.6			
New Mexico.....	95.7	4.3	98.6	1.4	98.9	1.1	99.2	.8	99.9	.1	99.6	.4	100.0	(1)	97.9	2.1	97.9	2.1			
North Dakota.....	97.0	3.0	96.7	3.3	98.7	1.3	100.0	-----	98.6	1.4	99.6	.4	100.0	-----	97.8	2.2	97.8	2.2			
Oklahoma.....	94.7	5.3	94.7	5.3	94.1	5.9	96.4	3.6	94.5	5.5	92.9	7.1	96.4	3.6	95.3	4.7	94.7	5.3			
Oregon.....	86.5	13.5	86.5	13.5	94.2	5.8	93.6	6.4	97.1	2.9	93.4	6.6	94.0	6.0	96.1	3.9	91.5	8.5			
Vermont.....	96.8	3.2	98.1	1.9	98.5	1.5	98.2	1.8	98.2	1.8	99.3	.7	99.2	1.8	97.6	2.4	97.6	2.4			
Washington.....	91.9	8.1	95.6	4.4	98.0	2.0	96.5	3.5	96.5	3.5	97.1	2.9	93.2	6.8	97.8	2.2	95.2	4.8			
Wisconsin.....	98.5	1.5	99.6	.4	99.6	.4	99.6	.4	99.6	.4	99.7	.3	99.5	.5	99.7	.3	99.2	.8			
Total.....	95.6	4.4	97.9	2.1	98.2	1.8	98.5	1.5	98.4	1.6	98.1	1.9	99.0	1.0	98.8	1.2	97.5	2.5			

¹ Less than 0.1 percent.

31 States. Because of the methods of tabulation adopted by the States, data for Arkansas, Colorado, Michigan, and New York are available only for the travel within the State of residence as shown in table 3.

Comparison of the data in tables 3 and 4 indicates that in all but one State the percentage of total travel for business purposes is smaller than the percentage of the travel within the State of residence for business purposes. This indicates that generally passenger-car travel outside the State of residence is predominantly for pleasure purposes, probably for vacation or holiday trips.

The one State where this condition is not true is Utah. The factor that controls this State percentage is the travel of Ogden and Salt Lake City motor-vehicle owners. The out-of-State travel of the motor-vehicle

owners living in unincorporated areas was also largely for business purposes and may be accounted for by the heavy concentration of residents in the northern sections of the State whose business centers are towns in Idaho and Wyoming. In 4 other States individual population groups show this difference, but in all cases the differences in percentages are small and in no case are large enough to affect the State total. In Montana, for incorporated places having a population of less than 1,000 there is a difference of 0.2 percent. In Louisiana, for incorporated places having a population of 1,001 to 2,500 there is a difference of 0.1 percent. In New Mexico, for incorporated places having a population of 2,501 to 5,000 there is a difference of 3.2 percent. This may be explained by the fact that all of the incorporated places in this group except Las Vegas are near

TABLE 3.—Classification of the travel in the State of residence of passenger cars of 35 States

State	Unincorporated areas		Distribution of travel by residents of—														All places	
			Incorporated places having a population of—															
	Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—	
	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure
Alabama	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	68.3	31.7	66.5	33.5	62.4	37.6	62.3	37.7	58.1	41.9	66.7	33.3	68.4	31.6	65.0	35.0	70.3	29.7
Arkansas	79.6	20.4	78.9	21.1	72.3	27.7	69.1	30.9	61.8	38.2	66.6	33.4	66.0	34.0	—	—	64.1	35.9
Colorado	73.7	26.3	63.7	36.3	62.5	37.5	55.1	44.9	63.5	36.5	62.3	37.7	51.1	48.9	58.4	41.6	73.0	27.0
Florida	69.6	30.4	71.9	28.1	64.7	35.3	59.1	40.9	61.2	38.8	50.5	49.5	50.8	49.2	54.0	46.0	62.6	37.4
Idaho	75.3	24.7	70.2	29.8	59.3	40.7	63.4	36.6	64.5	35.5	59.6	40.4	—	—	—	—	69.1	30.9
Illinois	61.9	38.1	53.7	46.3	49.3	50.7	48.5	51.5	48.5	51.5	43.8	56.2	47.3	52.7	54.8	45.2	52.8	47.2
Indiana	66.9	33.1	67.2	32.8	56.1	43.9	53.9	46.1	47.0	53.0	55.3	44.7	50.1	49.9	49.9	50.1	57.3	42.7
Iowa	67.7	32.3	63.9	36.1	54.9	45.1	51.7	48.3	31.6	68.4	45.1	54.9	62.6	37.4	51.7	48.3	59.4	40.6
Kansas	69.6	30.4	58.1	41.9	49.8	50.2	53.9	46.1	53.9	46.1	55.9	44.1	53.8	46.2	54.2	45.8	59.2	40.8
Kentucky	67.7	32.3	69.2	30.8	68.2	31.8	65.3	34.7	66.5	33.5	69.8	30.2	62.6	37.4	64.3	35.7	66.7	33.3
Louisiana	81.6	18.4	72.7	27.3	76.1	23.9	65.1	34.9	65.4	34.6	70.9	29.1	71.4	28.6	58.7	41.3	71.2	28.8
Maryland	74.7	25.3	65.9	34.1	69.3	30.7	64.0	36.0	64.0	36.0	68.4	31.6	57.9	42.1	79.7	20.3	74.7	25.3
Michigan	61.9	38.1	52.8	47.2	49.9	50.3	54.9	45.1	49.9	50.1	53.7	46.3	50.2	49.8	52.2	47.8	53.4	46.6
Minnesota	59.4	40.6	47.8	52.2	41.8	58.2	43.5	56.5	40.4	59.6	45.0	55.0	—	—	39.8	60.2	46.7	53.3
Missouri	75.1	24.9	69.4	30.6	69.4	30.6	63.9	36.1	63.9	36.1	55.5	44.5	67.7	32.3	60.1	39.9	65.3	34.7
Montana	73.0	27.0	51.2	48.8	55.7	44.3	63.3	36.7	53.7	46.3	56.2	43.8	51.4	48.6	—	—	63.5	36.5
Nebraska	71.2	28.8	65.8	34.2	59.7	40.3	59.8	40.2	60.8	39.2	61.1	38.9	57.2	42.8	63.0	37.0	65.1	34.9
Nevada	76.8	23.2	55.5	44.5	73.0	27.0	64.9	35.1	71.0	29.0	59.4	40.6	—	—	—	—	70.0	30.0
New Hampshire	—	—	72.4	27.6	70.2	29.8	63.7	36.3	63.7	36.3	53.5	46.5	52.5	47.5	—	—	62.8	37.2
New Mexico	57.7	42.3	68.0	32.0	66.7	33.3	38.4	61.6	60.6	39.4	56.4	43.6	59.0	41.0	—	—	58.0	42.0
New York	57.1	42.9	54.1	45.9	54.1	45.9	49.2	50.8	49.2	50.8	50.1	49.9	50.1	57.5	42.5	55.8	44.2	—
North Dakota	70.9	29.1	62.5	37.5	67.2	32.8	59.5	40.5	66.3	33.7	57.4	42.6	66.3	33.7	—	—	67.4	32.6
Ohio	59.4	40.6	56.7	43.3	52.7	47.3	44.2	55.8	44.2	55.8	44.5	55.5	48.4	51.6	49.3	50.7	51.3	48.7
Oklahoma	79.2	20.8	79.2	20.8	73.5	26.5	67.9	32.1	78.9	21.1	70.1	29.9	65.8	34.2	62.8	37.2	72.6	27.4
Oregon	67.1	32.9	58.4	41.6	48.7	51.3	56.2	43.8	48.1	51.9	53.0	47.0	38.1	61.9	54.6	45.4	57.9	42.1
South Dakota	66.8	33.2	57.6	42.4	52.7	47.3	57.0	43.0	54.1	45.9	55.8	44.2	52.5	47.5	—	—	60.0	40.0
Texas	63.1	36.9	66.0	34.0	61.0	39.0	61.2	38.8	57.4	42.6	55.5	44.5	56.5	43.5	57.3	42.7	59.9	40.1
Utah	51.5	48.5	51.1	48.9	55.9	44.1	53.4	46.6	49.4	50.6	52.2	47.8	47.4	52.6	61.2	38.8	54.4	45.6
Vermont	70.6	29.4	71.2	28.8	66.7	33.3	58.0	42.0	58.0	42.0	58.4	41.6	—	—	—	—	65.6	34.4
Virginia	70.2	29.8	58.4	41.6	74.5	25.5	56.9	43.1	61.0	39.0	65.2	34.8	57.3	42.7	51.8	48.2	65.7	34.3
Washington	69.7	30.3	65.2	34.8	64.6	35.4	61.6	38.4	61.6	38.4	59.8	40.2	58.3	41.7	61.9	38.1	64.3	35.7
West Virginia	64.1	35.9	62.3	37.7	54.9	45.5	61.2	38.8	52.9	47.1	47.1	52.9	46.6	47.1	43.8	—	58.5	41.5
Wisconsin	55.2	44.8	53.6	46.4	48.6	51.4	49.9	50.1	53.6	46.4	48.7	51.3	52.9	47.1	43.8	56.2	50.8	49.2
Wyoming	70.1	29.9	59.1	40.9	50.9	49.1	49.4	50.6	45.0	55.0	58.2	41.8	—	—	—	—	59.7	40.3
Total	67.0	33.0	61.0	39.0	57.7	42.3	56.0	44.0	54.6	45.4	53.9	46.1	53.7	46.3	54.5	45.5	58.6	41.4

the boundaries of the State. For several of them El Paso, Tex., is a natural shopping and marketing center and undoubtedly is the cause of the increased percentage of out-of-State travel for business purposes.

In Ohio, for incorporated places having a population of 5,001 to 10,000, there is a difference of 2.3 percent. There is no apparent geographic reason for this condition in Ohio since all the places in this group are spread more or less uniformly throughout the State.

Classification of the data of table 4 by geographic groupings of the States (table 5) indicates that in the Middle States the percentage of travel for business purposes is definitely lower than in other sections of the country. For purposes of comparison the groupings of States is the one that has previously been used in studying motor-vehicle trends in the United States.⁴

The groupings used are:

Region	States
Northeast	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware and Maryland.
Southeast	Virginia, West Virginia, Kentucky, North Carolina, Tennessee, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Arkansas.
Middle States	Ohio, Michigan, Indiana, Illinois, Wisconsin, Missouri, Iowa, and Minnesota.

Region

Northwest

North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, Idaho, and Utah.

Southwest

Oklahoma, Texas, New Mexico, and Arizona.

Far West

Washington, Oregon, California, and Nevada.

Data are available for a representative number of States in all except the Northeast region, where data for only Vermont, New Hampshire, and Maryland, are available. In a regrouping of this region with the Middle States with which it is somewhat similar it is found that the percentage of travel for business purposes (52.5 percent) is lower than in any other region or group of regions. Even if New York data, which are only for travel within the State of residence, were included the percentage of travel for business purposes in this region would still be lower than in the other areas since New York travel for business purposes was 55.4 percent of the total travel (table 3).

TWO-THIRDS OF ALL MOTOR-VEHICLE TRAVEL FOR BUSINESS PURPOSES IN 1940

Table 5 also indicates that generally as the size of the incorporated place increases the percentage of the motor-vehicle travel of the residents of those places for business purposes decreases. This condition appears to be true for all places except the cities having more than 100,000 population. In the Northeast region, Bulti-

⁴ Significant Trends in Motor-Vehicle Registrations and Receipts, by Robert H. Paddock, PUBLIC ROADS, October 1939.

TABLE 4.—Classification of the total travel of passenger cars of 31 States

State	Distribution of travel by residents of—																		All places	
	Unincorporated areas		Incorporated places having a population of—																	
			1,000 or less		1,001 to 2,500		2,501 to 5,000		5,001 to 10,000		10,001 to 25,000		25,001 to 100,000		100,001 or more					
	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—		
	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure		
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
Alabama	72.6	27.4	72.6	27.4	70.5	29.5	64.2	35.8	63.9	36.1	64.3	35.7	67.6	32.4	63.1	36.9	68.9	31.1		
Arizona	62.6	37.4	59.1	40.9	56.6	43.4	58.6	41.4	56.5	43.5	55.6	44.4	52.0	48.6	51.4	48.0	59.1	40.9		
Florida	68.2	31.8	70.4	29.6	62.3	37.7	57.2	42.8	58.0	42.0	48.0	52.0	48.6	51.4	52.0	48.0	57.4	42.6		
Idaho	73.2	26.8	69.1	30.9	55.5	44.5	61.7	38.3	63.2	36.8	56.9	43.1	60.6	39.6	64.8	33.2	66.8	33.2		
Illinois	60.3	39.7	51.6	48.4	47.4	52.6	45.4	54.6	45.4	54.6	40.4	44.6	43.4	56.6	47.9	52.1	48.1	51.9		
Indiana	65.3	34.7	65.1	34.9	54.6	45.4	51.9	48.1	46.3	53.7	52.8	47.2	46.3	53.7	46.8	53.2	54.8	45.2		
Iowa	67.4	32.6	61.8	38.2	53.2	46.8	49.8	50.2	29.3	70.7	43.3	56.7	61.6	38.4	48.7	51.3	57.8	42.2		
Kansas	67.1	32.9	55.6	44.4	46.4	53.6	50.8	49.2	50.8	49.2	54.1	45.9	48.7	50.3	49.7	56.2	43.8			
Kentucky	66.2	33.8	68.1	31.9	65.8	34.2	62.2	37.8	64.1	35.9	67.9	32.1	59.8	40.2	61.3	38.7	64.6	35.4		
Louisiana	80.8	19.2	71.2	28.8	76.2	23.8	64.2	35.8	64.8	35.2	70.6	29.4	70.1	29.9	57.9	42.1	70.1	29.9		
Maryland	72.5	27.5	62.2	37.8	66.0	34.0	60.0	40.0	60.0	40.0	67.1	32.9	54.1	45.9	75.6	24.4	71.4	28.6		
Minnesota	58.5	41.5	46.7	53.3	41.2	58.8	42.2	57.8	39.7	60.3	43.8	56.2	39.3	60.7	45.8	54.2				
Missouri	73.6	26.4	67.9	32.1	67.9	32.1	62.3	37.7	62.3	37.7	53.4	46.6	65.1	34.9	57.2	42.8	63.1	36.9		
Montana	72.7	27.3	51.4	48.6	54.1	45.9	61.2	38.8	53.5	46.5	55.7	44.3	48.7	51.3	63.0	37.0				
Nebraska	69.4	30.6	62.2	37.8	55.9	44.1	55.1	44.9	57.5	42.5	58.0	42.0	54.7	45.3	60.6	39.4	62.3	37.7		
Nevada	72.6	27.4	51.8	48.2	70.5	29.5	61.2	38.8	67.9	32.1	55.1	44.9	51.7	48.3	65.9	34.1				
New Hampshire					70.6	29.4	67.0	33.0	61.8	38.2	61.8	38.2	49.6	50.4	59.5	40.5				
New Mexico	55.6	44.4	62.0	38.0	63.9	36.1	41.6	58.4	58.6	41.4	52.2	47.8	55.6	44.4	55.6	44.4				
North Dakota	67.8	32.2	57.4	42.6	60.0	40.0	54.2	45.8	60.5	39.5	52.3	47.7	51.5	48.5	62.4	37.6				
Ohio	58.4	41.6	55.3	44.7	50.5	49.5	46.5	53.5	46.5	53.5	42.6	46.2	53.8	46.1	53.9	49.4	50.6			
Oklahoma	77.4	22.6	77.4	22.6	72.5	27.5	65.7	34.3	77.2	22.8	68.6	31.4	63.7	36.3	61.0	39.0	70.8	29.2		
Oregon	64.3	35.7	55.8	44.2	46.8	53.2	53.5	46.5	45.7	54.3	51.4	48.6	37.3	62.7	52.4	47.6	55.4	44.6		
South Dakota	64.7	35.3	55.1	44.9	49.1	50.9	54.2	45.8	49.3	50.7	52.6	47.4	48.0	50.0	56.9	43.1				
Texas	62.4	37.6	65.1	34.9	59.8	40.2	59.7	40.3	56.6	43.4	54.3	45.7	54.9	45.1	56.0	44.0	58.7	41.3		
Utah	53.1	46.9	50.3	49.7	55.3	44.7	50.6	49.4	43.8	56.2	32.0	68.0	49.7	50.3	62.9	37.1	55.1	44.9		
Vermont	67.5	32.5	67.5	32.5	64.8	35.2	53.6	46.4	53.6	46.4	55.1	44.9	51.7	48.3	62.3	37.7				
Virginia	68.5	31.5	57.4	42.6	72.8	27.2	55.5	44.5	59.5	40.5	64.2	35.8	56.1	43.9	49.4	50.6	64.0	36.0		
Washington	67.8	32.2	63.2	36.8	61.5	38.5	58.4	41.6	58.4	41.6	57.3	42.7	56.3	43.7	59.9	40.1	62.1	37.9		
West Virginia	62.3	37.7	59.5	40.5	52.9	47.1	58.2	41.8	49.9	50.1	44.6	55.4	50.2	49.8	55.8	44.2				
Wisconsin	54.4	45.6	52.7	47.3	47.4	52.6	48.7	51.3	52.8	47.2	47.8	52.2	51.0	49.0	42.4	57.6	49.6	50.4		
Wyoming	67.0	33.0	58.2	41.8	47.8	52.2	48.4	51.6	43.4	56.6	52.9	47.1	51.7	56.4	43.6					
Total	65.6	34.4	59.5	40.5	56.4	43.6	53.9	46.1	53.1	46.9	51.4	48.6	51.5	48.5	51.5	48.5	56.7	43.3		

TABLE 5.—Percentage of total passenger-car travel for business purposes, by regions

Region ¹	Percentage of total travel for business by residents of—										All places
	Unincorporated areas		Incorporated places having a population of—								
	1,000 or less	1,001 to 2,500	2,501 to 5,000	5,001 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more				
Northeast	71.6	67.5	66.3	60.1	57.7	57.4	50.5	75.6	67.8		
Southeast	69.1	67.0	65.6	60.3	59.0	58.4	57.7	55.6	63.2		
Southwest	65.3	68.6	63.4	59.9	62.6	58.6	55.7	57.2	61.4		
Middle States	61.8	56.6	51.2	48.6	47.0	45.0	48.7	47.3	51.4		
Northwest	68.0	57.6	51.6	53.5	53.3	54.2	51.8	56.6	59.3		
Far West	66.7	59.3	56.6	57.1	51.6	55.5	49.4	57.1	59.7		
Northeast and Middle States	62.8	57.4	52.8	49.6	47.6	46.1	48.8	48.8	52.5		
Southeast and Northwest	69.1	67.0	65.6	60.3	59.0	58.4	57.7	55.6	63.2		
Northwest, Southwest, and Far West	66.5	60.8	57.6	57.2	58.3	56.2	54.0	57.1	60.4		
31 States	65.6	59.5	56.4	53.9	53.1	51.4	51.5	51.5	56.7		

¹ The 31 States for which data were available were: Northeast—Maryland, New Hampshire, and Vermont; Southeast—Alabama, Florida, Kentucky, Louisiana, Virginia, and West Virginia; Southwest—Arizona, New Mexico, Oklahoma, and Texas; Middle States—Illinois, Indiana, Iowa, Minnesota, Missouri, Ohio, and Wisconsin; Northwest—Idaho, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming; Far West—Nevada, Oregon, and Washington.

more, Maryland, is the only city reported in that group and 75.6 percent of the travel by its residents was for business purposes. In New York, cities having more than 100,000 population reported 57.5 percent of their travel for business purposes. These are higher percentages of travel for business than are reported in the cities in the lower population groups. The same condition may be noted in the Northwest and Far West

regions and to a lesser degree in the Southwest region. Table 6 presents data showing the estimated percentages of all motor-vehicle travel for business purposes in all States in 1940. These approximations have been determined on the following basis. The total vehicle-miles of travel by passenger cars and trucks in 1940 was determined for the several States on the basis of data from the traffic and road-use surveys. These mileages are preliminary and subject to revision but are believed to be approximately correct. The distribution of passenger-car travel by purpose in the 35 States where such data were available was used in estimating the distribution in States where there were no data. All truck travel was classified as travel for business purposes. The sum of truck travel and of passenger-car travel for business purposes was taken to be the amount of total motor-vehicle travel for business purposes. It will be seen that the percentage of business travel varies from 55.8 percent in Minnesota to 80.8 percent in Arkansas but that in 31 States and the District of Columbia the range is between 62 and 72 percent.

In 16 States, the classification of travel was made on the basis of business, social, and recreational purposes rather than the break-down into business and pleasure purposes. For those 16 States it is therefore possible to note the classification of travel otherwise considered as pleasure travel into the two purposes—social and recreational. It was found difficult to establish arbitrary definitions of what is business or social or recreational travel since so frequently a single trip accomplishes several purposes. The farmer, for example,

TABLE 6.—Classification of estimated motor-vehicle travel by purposes in 1940

State	Total travel for all purposes	Passenger car travel for—		Truck and bus travel	Total travel for business purposes	
		Social and recreational purposes	Business purposes		Amount	Percentage of total travel
Alabama	3,193	723	1,601	869	2,470	77.4
Arizona	1,219	380	549	290	839	68.8
Arkansas	2,323	446	1,206	671	1,877	80.8
California	22,558	7,816	11,725	3,017	14,742	65.4
Colorado	2,901	892	1,492	517	2,009	69.3
Connecticut	5,123	1,949	2,461	713	3,174	62.0
Delaware	787	162	477	148	625	79.4
Florida	5,230	1,793	2,414	1,023	3,437	65.7
Georgia	5,283	1,505	2,796	982	3,778	71.5
Idaho	1,199	296	597	306	903	75.3
Illinois	20,115	8,744	8,102	3,269	11,371	56.5
Indiana	7,458	2,615	3,171	1,672	4,843	64.9
Iowa	5,814	2,055	2,814	945	3,759	66.7
Kansas	4,962	1,795	2,304	863	3,167	63.8
Kentucky	4,167	1,120	2,044	1,003	3,047	73.1
Louisiana	3,434	794	1,861	779	2,640	76.9
Maine	1,798	509	857	432	1,289	71.7
Maryland	4,055	938	2,343	774	3,117	76.9
Massachusetts	10,598	3,898	4,922	1,778	6,700	63.2
Michigan	14,785	5,871	6,727	2,187	8,914	60.3
Minnesota	6,771	2,991	2,527	1,253	3,780	55.8
Mississippi	2,488	525	1,226	737	1,963	78.9
Missouri	8,268	2,418	4,136	1,714	5,850	70.8
Montana	1,425	408	694	323	1,017	71.4
Nebraska	3,374	981	1,620	773	2,393	70.9
Nevada	366	97	187	82	269	73.5
New Hampshire	996	319	468	209	677	68.0
New Jersey	12,243	4,470	5,643	2,130	7,773	63.5
New Mexico	1,193	403	504	286	790	66.2
New York	26,086	9,371	11,830	4,885	16,715	64.1
North Carolina	5,972	1,675	3,111	1,186	4,297	72.0
North Dakota	1,152	348	577	227	804	69.8
Ohio	16,420	7,040	6,873	2,507	9,380	57.1
Oklahoma	5,240	1,265	3,068	907	3,975	75.9
Oregon	2,957	1,112	1,381	464	1,845	62.4
Pennsylvania	19,841	7,434	9,384	3,023	12,407	62.5
Rhode Island	1,948	747	942	259	1,201	61.7
South Carolina	2,983	864	1,605	514	2,119	71.0
South Dakota	1,433	460	608	365	973	67.9
Tennessee	5,451	1,415	2,833	1,203	4,036	74.0
Texas	17,056	5,103	7,252	4,701	11,953	70.1
Utah	1,483	536	657	290	947	63.9
Vermont	772	223	369	180	549	71.1
Virginia	4,602	1,310	2,330	962	3,292	71.5
Washington	4,445	1,413	2,314	718	3,032	68.2
West Virginia	3,202	1,073	1,354	775	2,129	66.5
Wisconsin	6,972	2,913	2,866	1,193	4,059	58.2
Wyoming	708	237	306	165	471	66.5
District of Columbia	1,478	441	844	193	1,037	70.2
Total	204,327	101,893	137,972	54,462	192,434	65.4

goes to town to market some of his goods, to obtain provisions, to see a movie, and to visit with other farmers and their families of that area. Similarly, the city wife may take her husband to work, her children to school, and do her marketing on the way home, all on the same trip. In the case of such overlapping purposes, it was generally the policy to classify the trip according to its major purpose.

Although this difficulty in classifying travel definitely according to purposes existed to a limited extent when the classification was made between business and pleasure purposes, the further classification of pleasure travel into social and recreational purposes was frequently even more difficult. A Sunday ride which included a visit to friends, a week-end or vacation trip which included a visit with relatives as well as the pursuit of purely recreational activities, a trip to the theater or to a dance which combined social and recre-

ational functions were all difficult to classify definitely. However, a large majority of the trips could be classified correctly and the results in 16 States where this was done are shown in table 7.

The data in table 7 show that travel for recreational purposes is generally greater than that for social purposes. There appears to be no general pattern of travel in the several States, or among the several population groups. In some States recreational travel is about the same percentage of total travel as is travel for social purposes; in other States recreational travel is more than twice as great as social travel; in only four States is social travel greater than recreational travel.

These data suggest that there may actually be considerable differences in the purpose of travel in the several States depending on economic conditions and also on available recreational facilities in the State or adjacent States. It is also possible that the difficulty in distinguishing accurately between social and recreational travel may be the cause of the conditions observed in table 7. If this be true then the data in table 7 can be considered only as indicative of general conditions.

Certain other studies have been made recently which furnish additional information on the subject of the purpose of travel.⁵ The Automobile Manufacturers Association made a special study in six States⁶ of the road-use survey data previously collected in connection with the regular highway planning surveys. The special six-State study was particularly concerned with a detailed analysis of business or necessity use of passenger cars, and included as business use travel incurred taking children to and from school, a type of travel generally classed as nonbusiness travel in most of the State surveys.

Special attention was directed to business travel to determine the number of trips and amount of travel annually for each of the business purposes specifically classified in the road-use studies. It was the objective of this special study to determine for the various occupational groups among car owners how much of the business travel was concerned with transportation to and from work, how much with the actual conduct of business, how much for shopping and marketing, how much for taking children to and from school, etc.

BUSINESS TRIPS RELATIVELY SHORT BUT VERY NUMEROUS

Date obtained in these special studies indicate that while the percentage of travel for business purposes is high, the percentage of the total trips for business purposes is even higher. Table 8 shows that in four of the six States this condition was true. Complete data on the analysis of travel in Connecticut and Georgia are not yet available, the special analyses in those two States having been made by the Automobile Manufacturers Association personnel prior to the completion of the regular planning survey study. This relation is that which would be expected because today the automobile has come to occupy such an important part in everyday business activities. The large mileage that is accounted for in social and recreational purposes is generally accomplished in a smaller number of long trips such as vacation, fishing, and hunting trips and visits to friends. Business trips, though more numerous, are generally shorter—between home and place of employment—and it has not been generally realized what a large

⁵ See particularly, A Factual Survey of Automobile Usage, Automobile Manufacturers Association, 1941.

⁶ Connecticut, Georgia, Indiana, Michigan, Nebraska, and Oregon.

TABLE 7.—Classification of the total travel of passenger cars of 17 States for social and recreational purposes

State	Distribution of travel by residents of—																	
	Unincorporated areas		Incorporated places having a population of—														All places	
			1,000 or less		1,001 to 2,500		2,501 to 5,000		5,001 to 10,000		10,001 to 25,000		25,001 to 100,000		100,001 or more			
	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	Travel for—	
	Social	Recrea-	Social	Recrea-	Social	Recrea-	Social	Recrea-	Social	Recrea-	Social	Recrea-	Social	Recrea-	Social	Recrea-	Social	Recrea-
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Alabama	15.5	11.9	14.6	12.8	13.9	15.6	16.4	19.4	15.6	20.5	14.4	21.3	10.9	21.5	13.7	23.2	14.6	16.5
Arizona	13.5	23.9	14.4	26.5	18.9	24.5	15.3	25.1	16.9	26.6	12.0	32.4	—	—	13.8	27.1	—	—
Florida	15.8	16.0	11.6	18.0	16.0	21.7	11.9	30.9	13.2	28.8	12.5	39.5	14.7	36.7	10.0	38.0	12.9	29.7
Indiana	22.3	12.4	19.6	15.3	26.1	19.3	30.4	17.7	30.8	22.9	22.1	25.1	33.6	20.1	29.3	23.9	26.5	18.7
Kentucky	24.1	9.7	21.8	10.1	18.7	15.5	18.1	19.7	17.3	18.6	15.1	17.0	18.6	21.6	18.6	20.1	21.2	14.2
Louisiana	10.2	9.0	13.2	15.6	7.9	15.9	14.8	21.0	10.6	24.6	6.4	23.0	9.0	20.9	5.7	36.4	9.1	20.8
Montana	9.3	18.0	11.5	37.1	14.2	31.7	4.5	34.3	3.0	43.5	8.0	36.3	13.4	35.3	—	—	9.5	27.5
Nebraska	19.8	10.8	15.7	22.1	19.4	24.7	15.6	29.3	11.8	30.7	14.9	27.1	16.4	28.9	9.7	29.7	16.1	21.6
Nevada	5.9	21.5	10.9	37.3	3.1	26.4	4.6	34.2	2.5	29.6	6.2	38.7	—	—	—	—	5.3	28.8
New Hampshire	—	—	18.4	11.0	15.8	17.2	14.6	23.6	14.6	23.6	11.2	39.2	12.0	39.7	—	—	14.4	26.1
New Mexico	9.9	34.5	10.2	27.8	5.7	30.4	11.0	47.4	8.8	32.6	6.2	41.6	9.6	34.8	—	—	9.1	35.3
North Dakota	20.0	12.2	17.2	25.4	14.2	25.8	3.8	42.0	8.8	30.7	15.6	32.1	7.2	41.3	—	—	16.9	20.7
Oregon	17.5	18.2	18.8	25.4	22.3	30.9	14.7	31.8	19.7	34.6	16.5	32.1	28.0	34.7	16.4	31.2	17.7	26.9
South Dakota	20.4	14.9	14.9	30.0	13.2	37.7	12.7	33.1	10.6	40.1	11.1	36.3	18.3	33.7	—	—	16.1	27.0
Texas	25.4	12.2	18.2	16.7	19.6	20.6	18.3	22.0	20.0	23.4	19.3	26.4	19.3	25.8	19.5	24.5	21.4	19.9
Vermont	16.8	15.7	18.2	14.3	13.7	21.5	16.8	29.6	16.8	29.6	18.3	26.6	—	—	—	—	16.8	20.9
West Virginia	23.0	14.7	23.0	17.5	22.8	24.3	25.9	15.9	25.8	24.3	30.6	24.8	26.4	23.4	—	—	24.8	19.4
Total	20.2	13.5	17.1	19.5	18.1	21.9	17.7	24.1	17.9	26.5	16.4	28.8	19.3	26.6	17.5	27.8	18.6	21.5

mileage is accounted for by these relatively short but very numerous trips.

TABLE 8.—Relation of business travel to total travel by passenger cars in four States with a comparison of number of trips and mileage traveled

State	Percentage for business purposes of—	
	Total number of trips	Total annual vehicle-miles of travel
Indiana	76.3	54.8
Michigan	73.9	53.4
Nebraska	78.4	62.3
Oregon	80.9	55.4

Another important set of data obtained by the Automobile Manufacturers Association in their special study in the six States indicated the relation between the age of the vehicle and the percentage of use for business purposes. A previous study⁷ by the Public Roads Administration in which an analysis of planning survey data was made reported the observed decrease in average annual travel of passenger cars in relation to their age. A similar study was made of the data in the six States and the results are shown in table 9. These data have not been adjusted in the manner followed by the several States in handling their respective motor-vehicle and road-use survey data but it is believed that, despite their having been taken directly from the road-use interviews, they satisfactorily indicate the general trends that are present.

It will be seen that the annual travel is less for the older vehicles, but that the older vehicles are used to a greater extent for business travel than are the newer vehicles. This is particularly true of the vehicles 9 years or more in age and indicates that these vehicles serve a more utilitarian purpose than do the newer cars.

⁷ Distribution of Motor Vehicle Registrations and Tax Payments by Regions and Population Groups, by Ralph S. Lewis and Homer L. Baker, PUBLIC ROADS, January 1942.

It also suggests that the older cars are not used as extensively for long trips away from home, because for the older vehicles the percentage of trips for business purposes is only slightly higher than in the case of the newer vehicles although the percentage of annual miles traveled for business purposes is considerably higher than in the case of the newer vehicles. It should also be noted in this connection that the average trip length for the older cars is approximately a third less than the average trip for the newest cars.

TABLE 9.—Effect of age of passenger car on travel characteristics¹

Age of car, years	Average annual travel	Average number of round trips	Average trip length	Percentage of total travel for business purposes	Percentage of total trips for business purposes			
				Miles	Number	Miles	Percent	Percent
1	10,768	619	17.4	54.7	—	—	77.2	—
2	9,628	620	15.5	54.7	—	—	77.6	—
3	8,592	593	14.5	54.2	—	—	77.2	—
4	8,106	604	13.4	53.5	—	—	77.5	—
5	7,624	545	14.0	52.8	—	—	75.2	—
6	7,083	524	13.5	53.0	—	—	74.8	—
7	6,718	496	13.5	53.9	—	—	75.9	—
8	5,804	468	12.4	56.6	—	—	76.6	—
9 and more	4,770	417	11.4	61.2	—	—	78.8	—

¹ Unadjusted data for Connecticut, Georgia, Indiana, Michigan, Nebraska, and Oregon, analyzed by the Automobile Manufacturers Association.

A special study by the Opinion Research Corporation, also reported in Automobile Manufacturers Association study indicates that the percentage of total travel for business purposes in the 35 States as reported in this article may be quite conservative. The Opinion Research Corporation survey covered a period of 1 week in the early part of the winter of 1940. It would be expected that some bias would result from such a seasonal choice since cars would be used more for shopping and other similar purposes and less for recreational purposes than at certain other times of the year. Results of that study for the test week in December showed 37 percent of the total travel to have been for business, 18 percent going to and from work, 11 percent

for shopping, 2 percent taking children to and from school, and 32 percent for social and recreational purposes. It will be noted that the first three purposes, which are classed in the States' road-use surveys as business travel, account for 66 percent of the total travel while the results reported in this article for 31 States, in table 4, show 56.7 percent of the total travel for business purposes.

It would be desirable, if adequate data were available, that comparisons be made between the purposes of travel today, and those in earlier years. Some data for early traffic surveys are available on this subject but are not comparable with the present data. However, the data for the early years are of interest in showing, for such observations as were made, the relationships existing in those years between the various purposes of travel. Although it is believed that the available data for various reasons represent a considerably smaller percentage of the travel for business purposes than actually existed it is significant that even under these conditions the percentage of travel for business purposes was high.

DATA FROM EARLY TRAFFIC STUDIES PRESENTED

A Connecticut transportation study made in 1923 classified all trip mileage according to business and nonbusiness travel and indicated that 44.5 percent of all passenger-car travel was for business purposes.⁸ A definite relation was also observed in this survey between trip length and the purpose for which the car was used. For trips of less than 19 miles, 52.2 percent were for business while on trips of 500 miles or over, the percentage for business was only 12.6. In trips of 100 to 149 miles the percentage for business was 34.5 percent. In this travel study data were classified according to trips and not according to total mileage traveled, and the study was limited to the rural highways.

In the Pennsylvania survey conducted in 1924 52.8 percent of the passenger car traffic on the primary highway system of the State was found to be for business purposes.⁹

The survey made in the Cook County, Ill., area in 1924 revealed that at selected stations in that area 32.1 percent of the passenger car trips were for business purposes.¹⁰

The Ohio survey conducted in 1925 indicated that 55.4 percent of the passenger car traffic on the Ohio State Highway system was for business purposes.¹¹

A Vermont survey in 1926 obtained data on the basis of which it was estimated that 33.7 percent of the travel on Federal-aid and numbered State-aid roads was for business purposes.¹²

A similar study in New Hampshire in the same year indicated that 24.6 percent of the passenger-car traffic on the trunk line system of the State was for business

⁸ The Connecticut Transportation Survey, PUBLIC ROADS, August 1926.

⁹ Report of a Survey of Transportation on the State Highways of Pennsylvania, United States Bureau of Public Roads and the Pennsylvania Department of Highways, 1928.

¹⁰ Report of a study of Highway Traffic and the Highway System of Cook County, Ill., by the United States Bureau of Public Roads and the Cook County Highway Department, 1925.

¹¹ Report of a Survey of Transportation on the State Highway System of Ohio, United States Bureau of Public Roads and the Ohio Department of Highways and Public Works, 1927.

¹² Digest of Vermont Highway Transportation Survey, by J. Gordon McKay, PUBLIC ROADS, December 1927.

purposes.¹³ This figure approximates that for Vermont and shows a considerably lower percentage for business travel on primary rural routes than in other States. This may be accounted for by the high volume of travel in those two States for recreational purposes by motor-vehicle owners of adjacent States. The higher percentage of travel for business purposes in Vermont as compared to New Hampshire may also be accounted for by the fact that at that time, and to a considerable extent even today, the tourist or recreational facilities of Vermont had not been developed or utilized as much as those in New Hampshire. Also the recreational facilities in the latter State were closer to the large populations of Connecticut, Massachusetts, and Rhode Island than were the existing facilities of Vermont.

In contrasting these figures with those from the current studies it should also be remembered that the recent figures include travel on all roads and streets and that the travel reported is that performed both in and out of the State by the motor-vehicle owners of that State. The earlier study essayed analysis of the travel as it occurred on any given system of roads regardless of that travel's in-State or out-of-State origin.

Several factors affect the comparability of the data from all these surveys. In all cases the figures from the earlier studies represent only traffic on rural roads and in several cases only that on the primary highway systems. There is thus omitted a large volume of traffic on city streets and on local rural roads where generally the percentage of travel for business purposes is considerably higher than on the main rural highways. In some of the surveys percentages of travel for business purposes were computed only on the basis of the number of trips observed which gives undue weight to the longer trips.

Data that are more nearly comparable with those of the present studies were obtained in financial-economic studies conducted in Wisconsin in 1930 and in Minnesota in 1933. Road-use surveys were integral parts of these studies and provided the following data relative to the purpose of travel of Wisconsin passenger-car owners.¹⁴

Place of ownership:	Percentage of total travel for business purposes
Rural areas	64.3
Incorporated places having a population of	
2,500 or less	54.9
2,501 to 15,000	54.9
15,001 to 75,000	56.7
Milwaukee	62.9
State	60.1

These figures are somewhat higher than the planning survey figures obtained 6 years later where only 49.6 percent of the travel of residents of the State was found to be for business purposes. It is possible that there has been an increased use of the automobile for pleasure purposes in more recent years, especially since the economic depression of the early 1930's. This theory appears to be substantiated by the results of the Minnesota study conducted in 1933.¹⁵ Analyses of the

¹³ Report of a Survey of Transportation on the State Highways of New Hampshire, United States Bureau of Public Roads and the New Hampshire State Highway Department, 1927.

¹⁴ The Wisconsin Financial Survey, PUBLIC ROADS, April 1933.

¹⁵ Highways and Public Finance in Minnesota in 1932, by the United States Bureau of Public Roads and the Minnesota Department of Highways, 1934.

TABLE 10.—Percentage of passenger cars traveling outside State of ownership

State	Unincorporated areas	Percentage of cars owned in—						Total	
		Incorporated places having a population of—							
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more		
Alabama	38.0	50.1	57.1	68.1	60.0	53.2	49.6	47.3	
Arizona	31.5	34.2	37.3	48.0	42.7	36.4	32.6	38.2	
Arkansas	22.9	24.3	39.4	34.7	36.4	32.6	30.5	27.6	
Colorado	28.1	43.4	50.0	43.4	63.8	38.1	35.3	38.3	
Florida	27.7	27.2	40.9	33.8	37.7	38.0	32.1	32.7	
Idaho	45.7	58.3	57.1	70.2	51.9	—	—	53.7	
Illinois	26.1	38.2	46.4	55.2	50.7	61.1	75.6	56.6	
Indiana	31.2	44.2	49.1	48.1	50.6	58.5	48.7	43.4	
Iowa	28.8	40.3	49.6	50.6	52.4	61.8	52.1	43.9	
Kansas	34.3	50.4	54.4	63.0	68.6	49.1	75.0	51.5	
Kentucky	34.2	38.3	54.8	62.0	57.8	69.0	51.2	44.9	
Louisiana	21.2	27.0	31.9	32.0	40.4	45.7	36.9	31.6	
Maryland	73.2	87.1	90.7	87.0	84.8	92.0	81.2	79.3	
Michigan	24.0	27.2	31.7	32.5	49.4	36.5	37.6	34.7	
Minnesota	21.0	32.8	31.1	39.2	38.6	—	37.6	31.2	
Missouri	17.7	30.8	30.8	26.8	27.8	31.1	33.3	27.3	
Montana	27.9	52.6	50.0	52.8	52.8	24.2	—	—	
Nebraska	27.5	49.0	52.8	58.3	44.0	41.4	42.8	39.3	
Nevada	55.2	20.2	58.4	72.8	83.8	—	—	66.6	
New Hampshire	56.7	62.0	75.8	82.2	71.3	—	—	69.6	
New Mexico	28.0	74.0	58.9	53.6	45.4	31.9	—	40.7	
New York	34.5	39.2	39.2	42.0	48.1	47.2	47.0	44.6	
North Dakota	24.9	40.8	65.2	51.6	63.3	75.3	—	37.0	
Ohio	24.0	37.2	38.6	43.8	47.1	49.1	53.5	42.0	
Oklahoma	30.8	30.8	40.6	50.9	53.6	34.2	56.9	42.6	
Oregon	31.4	51.1	49.3	50.3	68.4	36.7	60.1	47.1	
Pennsylvania	32.0	43.0	48.0	50.5	51.7	59.1	69.3	50.9	
South Dakota	38.8	52.6	66.7	66.6	54.3	83.7	—	50.5	
Texas	14.2	17.6	18.3	26.4	29.0	24.7	21.1	19.9	
Utah	31.5	43.9	46.4	43.4	45.5	69.8	63.7	47.7	
Vermont	45.2	53.8	52.8	61.5	59.8	—	—	51.6	
Virginia	43.3	71.3	61.7	55.8	75.9	47.9	61.8	50.8	
Washington	34.7	43.2	45.3	51.0	62.4	49.9	48.5	44.6	
West Virginia	45.4	59.0	64.4	64.6	78.0	68.0	—	57.9	
Wisconsin	23.3	37.1	49.9	42.5	53.9	50.4	51.2	40.4	
Wyoming	57.1	63.7	64.8	67.2	60.8	—	—	61.2	
Total	29.9	40.3	44.2	46.7	51.1	50.4	50.1	42.8	

Minnesota data indicated that the following percentages of the total passenger-car travel of Minnesota motor-vehicle owners were for business purposes.

Place of ownership:	Percentage of total travel for business purposes
Rural areas	59.0
Incorporated places having a population of—	
2,500 or less	48.9
2,501 to 15,000	50.0
15,001 to 75,000	53.0
75,001 to 400,000	48.2
Minneapolis	51.9
State	52.7

In the road-use survey conducted as a part of the Minnesota planning survey three years later only 45.8 percent of the total travel was found to have been for business purposes, or, as in the case of Wisconsin, a definite decrease from the earlier figure. In Wisconsin, where the decrease was somewhat larger the period of time involved was twice as long as that between the two Minnesota studies and may account for the difference if the trend observed is actual. It should be noted, however, that Minnesota and Wisconsin, along with Ohio and Illinois are the only States included in this study in which less than 50 percent of the passenger-car travel was reported to be for business purposes. It is, therefore, possible that the trends noted in Minnesota and Wisconsin, of an increasing percentage of the total travel for social and recreational purposes, may not be true of other States where different economic

TABLE 11.—Percentage of trucks traveling outside State of ownership

State	Unincorporated areas	Percentage of trucks owned in—						Total	
		Incorporated places having a population of—							
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more		
Alabama	36.7	35.1	41.7	36.3	22.7	21.4	12.9	32.1	
Arizona	11.0	11.3	9.5	18.3	—	19.9	—	14.8	
Arkansas	19.4	23.5	17.5	17.8	20.9	7.6	—	18.8	
Colorado	11.1	13.0	12.0	5.3	22.1	4.4	15.6	11.8	
Florida	16.0	8.9	13.2	4.7	6.1	4.9	5.1	9.1	
Idaho	30.9	45.7	15.5	41.5	21.3	—	—	30.7	
Illinois	13.8	17.0	14.9	8.6	3.2	10.7	6.1	10.1	
Indiana	17.9	23.1	21.4	14.2	12.7	18.8	10.8	16.5	
Iowa	15.1	15.5	16.6	13.2	9.2	7.4	3.4	11.9	
Kansas	16.3	13.0	15.4	14.8	15.0	4.6	29.1	16.3	
Kentucky	26.7	41.3	29.0	27.2	19.1	31.8	11.7	25.6	
Louisiana	7.9	6.9	9.5	7.4	18.7	22.1	9.0	9.5	
Maryland	43.5	59.2	64.8	44.6	29.5	66.8	43.1	45.2	
Michigan	10.3	9.7	9.8	3.9	16.0	3.7	43.9	6.0	
Minnesota	9.5	10.4	6.5	8.2	5.2	—	2.8	7.6	
Missouri	18.6	27.6	27.6	12.4	10.7	14.1	11.8	16.5	
Montana	14.4	14.5	18.5	15.5	15.2	1.1	—	13.8	
Nebraska	15.2	20.8	18.4	18.4	9.1	7.7	11.0	15.4	
Nevada	28.6	—	12.1	12.9	17.6	—	—	20.6	
New Hampshire	—	29.2	32.2	43.8	41.8	24.0	—	33.8	
New Mexico	7.2	17.5	23.9	19.3	21.8	16.9	—	13.7	
New York	8.4	9.3	9.3	8.4	9.1	9.4	7.9	8.8	
North Dakota	7.6	17.0	24.1	15.2	9.6	37.5	—	11.6	
Ohio	9.5	13.3	10.5	12.6	15.5	9.8	11.5	11.5	
Oklahoma	14.3	14.3	12.6	15.5	14.0	9.1	5.1	14.0	
Oregon	16.2	17.6	23.2	10.6	32.6	5.1	24.5	18.3	
Pennsylvania	14.5	16.1	17.8	12.6	10.8	19.1	19.7	16.4	
South Dakota	25.6	25.8	33.7	12.9	12.6	26.1	—	24.1	
Texas	6.0	7.9	6.6	9.8	12.4	11.8	8.8	8.1	
Utah	18.5	23.8	23.8	17.1	7.4	32.4	18.1	20.0	
Vermont	23.6	9.1	15.6	28.8	17.8	—	—	22.0	
Virginia	30.6	41.8	40.0	20.8	37.8	11.1	.8	23.6	
Washington	20.8	26.4	16.0	21.2	22.4	9.0	12.6	18.9	
West Virginia	31.8	43.7	34.0	32.7	36.8	22.5	—	30.6	
Wisconsin	5.6	9.4	11.3	7.0	14.6	9.4	2.4	7.0	
Wyoming	32.2	32.2	19.8	30.0	14.7	—	—	28.0	
Total	15.7	18.0	16.7	13.6	14.7	13.2	12.9	14.0	

and other conditions have resulted in higher percentages of travel for business purposes.

FORTY-THREE PERCENT OF PASSENGER CARS PERFORM SOME TRAVEL OUTSIDE STATE OF OWNERSHIP

From the data obtained in the road-use surveys it is possible also to make certain other analyses regarding travel characteristics. These items include (1) percentage of vehicles traveling in other States than that where owned;¹⁶ (2) percentage of the total travel that is performed outside the State where the motor vehicle is owned; and (3) percentage of vehicles traveling in counties other than that where owned. Because of variations in size of counties, size of States, geographical conditions, location of marketing centers and location of population areas within the respective States, these figures cannot be used without proper qualifications. They are, however, informative of general characteristics.

Tables 10 and 11 show for each of the various population groups of 36 States the percentage of all passenger cars and of all trucks that travel outside the State at some time during the year. Other analyses of the road-use survey data have indicated that a large percentage of the total travel is accounted for by numerous short trips within a short radius of the place of residence. It is somewhat surprising, however, to discover in an era of surfaced roads connecting all parts of the country that almost 60 percent of the passenger cars, in the 36

¹⁶ Throughout this report, the term "place where owned" is used to indicate the place where the vehicle is regularly garaged.

States studied, never leave the State where they are owned in the course of their annual travel.

Table 10 shows that the lowest percentage of vehicles traveling outside the State occurs in the unincorporated areas and that generally the percentage traveling out of the State tends to increase as the size of the population group increases. There are few exceptions to this general tendency and most of those can be readily explained.

In Alabama, a somewhat smaller percentage of Birmingham (largest population group) cars travel outside the State than is the case for other population groups. This is undoubtedly caused by the location of that city in the interior of the State. A similar condition is evidenced in Colorado for cars owned by Denver residents. Denver, too, is toward the interior of the State and a large share of the vacation or holiday travel of Denver residents would be in the mountain areas to the west of the city.

In Florida a similar condition, to a somewhat lesser degree, is noted in the largest population group, which includes Jacksonville, Miami, and Tampa. Although Jacksonville is near the northern boundary of the State, Tampa and Miami residents have to travel 200 to 400 miles to get outside the State. As in the case of Alabama and Colorado, it is therefore understandable that a smaller percentage of vehicles in this population group should go outside the State, even though the proximity of Jacksonville provides a somewhat counterbalancing effect.

Similar conditions can also be observed in varying degrees in the 100,001 or more population group in Iowa where Des Moines is in the interior of the State, in Indiana where Indianapolis is in the center of the State though four other smaller cities in the group are nearer the State boundaries, and in Louisiana where New Orleans is some distance away from State boundaries.

The situation in Kentucky where Louisville is the only city in that group may be explained by the fact that although this city is on a State boundary the toll bridges across the Ohio River probably form an effective barrier to the north and disperse more of the traffic in other directions than would otherwise be the case.

It should be observed that in four Southern States—Arkansas, Florida, Louisiana, and Texas—the percentage of vehicles traveling outside the State is low. General economic conditions, including lower average cash incomes than elsewhere in the country, may account for this travel characteristic in some instances, but for Texas the distances which must be traveled from most population concentrations in order to reach a State boundary no doubt provides the explanation.

Although a low percentage of vehicles traveling outside the State is found in Michigan and Minnesota it is believed that the explanation there is somewhat different. Michigan has only a relatively small portion of its boundaries contiguous with other States. For the greater part of its boundaries it has four of the Great Lakes. In addition it has varied and extensive natural and developed recreational facilities within its own boundaries so that its residents need not drive outside the State for their recreation. Conditions in Minnesota are somewhat similar. To the north lies a sparsely populated section of Canada, which serves somewhat as a natural barrier to out-of-State travel in that direction. States to the east, south, and west of Minnesota offer few recreational facilities that the State itself does not have. It might be thought that

similar conditions would exist in Wisconsin but it must be remembered that the most densely populated areas are located in the southeastern part of the State which is adjacent to the Chicago metropolitan area, a fact which might be expected to create greater out-of-State travel by Wisconsin residents.

The rather high number of Maryland cars traveling out-of-State, as shown in table 10 is to be expected because of the size and shape of the State. The narrow western panhandle and the Baltimore concentration within 40 miles of the State boundary are both conducive to a large percentage of cars traveling outside the State. A similar condition exists in New Hampshire, a relative small State, where approximately 70 percent of the population is concentrated in the five southern counties which account for only about 40 percent of the area of the State.

The high percentage of Nevada cars traveling outside the State can likewise be accounted for by the distribution of population in the State. Approximately 39 percent of the population is located within a short distance of the California boundary in the Reno-Carson City area, 24 percent in the northeast area adjacent to Idaho and Utah and 9 percent in the southern tip of the State in the Las Vegas area.

FOURTEEN PERCENT OF TRUCKS PERFORM SOME TRAVEL OUTSIDE STATE OF OWNERSHIP

Table 11 presents similar data for trucks. It will be noted that the percentage of trucks traveling outside the State of ownership is relatively small compared to that for cars.

As in the case of cars, the 45.2 percent of Maryland trucks going outside the State is definitely higher than for any other State.

Only four other States reported more than 30 percent of their trucks traveling outside the State. These were Alabama, Idaho, New Hampshire, and West Virginia. This condition can be explained in the latter State by the heavy industrial development in the western part of the State and also in the panhandle region near the Pittsburgh area.

Tables 12 and 13 show for 34 States the percentages of cars and of trucks traveling outside the counties of ownership in the respective States. Adequate bases of comparison are even more lacking here than in the case of out-of-State travel. In addition to such factors as the degree of urbanization of the county, the location of shopping and marketing centers, and the condition of road systems in the county of residence and adjacent counties, the size of the county is probably the most important single item. Counties throughout the United States vary widely in size from Arlington County, Va., of 25 square miles to San Bernardino County, Calif., with 20,175 square miles.

Only 6 of the 34 States reported that less than 80 percent of the passenger cars traveled outside the county of residence during the year. Four of these were Western States—Arizona with an average county area of 8,129 square miles, Nevada with an average county area of 6,460 square miles, New Mexico with an average county area of 3,952 square miles and Wyoming with an average county area of 4,241 square miles.

A comparison of Nevada data in tables 10 and 12 reveals an apparent contradiction of table 10 by table 12. This is due to the nature of the out-of-county travel analysis. In table 10 Nevada was shown to have the third from the highest percentage of cars

TABLE 12.—Percentage of passenger cars traveling outside county of ownership¹

State	Unincorporated areas	Percentage of cars owned in—						Total	
		Incorporated places having a population of—							
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more		
Alabama	84.7	93.9	94.4	94.8	89.6	82.3	86.5	86.9	
Arizona	61.9	61.6	77.9	63.2	77.6	—	—	66.8	
Arkansas	71.2	84.2	90.1	90.1	91.3	91.0	—	80.0	
Colorado	90.0	96.3	99.2	98.8	93.3	95.7	98.0	94.8	
Florida	76.9	89.4	91.1	86.2	87.9	76.5	79.6	81.3	
Idaho	85.0	94.0	95.7	94.7	95.8	—	—	89.9	
Illinois	80.7	89.9	88.3	91.1	88.2	88.8	82.1	85.0	
Indiana	78.5	89.3	92.7	92.4	90.1	84.3	75.5	81.9	
Iowa	84.4	92.6	93.4	93.0	92.5	79.5	91.5	87.7	
Kansas	83.6	92.6	94.5	91.1	93.1	91.2	86.6	87.7	
Kentucky	83.4	92.2	94.0	92.9	89.6	87.3	76.3	83.2	
Louisiana	75.6	91.7	91.9	85.8	79.0	70.6	55.5	70.9	
Maryland	86.0	90.6	92.0	94.7	96.0	88.3	95.4	90.5	
Michigan	86.1	93.4	94.6	90.4	90.8	95.1	90.8	90.8	
Minnesota	80.7	95.8	94.5	96.4	97.5	—	98.3	91.6	
Missouri	78.4	89.7	89.7	83.6	33.9	84.0	75.2	76.3	
Montana	83.8	95.1	97.9	92.9	95.8	93.6	—	90.4	
Nebraska	79.4	90.6	89.8	84.6	92.8	85.4	55.7	80.6	
Nevada	54.6	62.3	91.1	54.0	87.8	—	—	63.2	
New Mexico	67.1	77.0	84.7	68.8	81.8	87.1	—	74.1	
New York	81.2	90.9	90.9	90.1	90.4	91.9	83.7	81.6	
North Dakota	81.5	95.0	92.0	95.9	87.7	77.8	—	86.3	
Ohio	85.8	92.7	94.8	93.2	93.4	94.0	90.4	90.4	
Oklahoma	83.1	83.1	87.7	88.7	96.8	64.6	91.9	86.9	
Oregon	88.0	92.7	95.8	98.1	95.6	98.1	92.9	91.9	
Pennsylvania	80.4	99.7	83.5	91.9	92.8	92.4	80.1	86.5	
South Dakota	73.7	83.7	95.2	94.1	91.2	98.4	—	85.1	
Texas	83.8	93.1	94.8	93.0	90.6	86.5	82.1	86.2	
Utah	92.6	93.6	89.6	95.0	84.9	99.3	97.6	94.3	
Virginia	81.5	94.1	95.3	92.9	89.7	92.0	94.9	87.1	
Washington	82.8	90.2	91.5	92.7	89.0	91.2	90.2	87.9	
West Virginia	88.0	91.9	91.0	96.2	95.6	92.9	—	90.8	
Wisconsin	86.1	94.4	93.9	95.4	97.0	92.0	96.6	92.2	
Wyoming	74.0	83.0	88.5	84.4	80.2	—	—	79.5	
Total	81.5	90.0	89.4	89.8	88.3	88.1	85.3	85.2	

¹ Travel outside the county refers only to travel in other counties in the State of ownership. Data for New Hampshire and Vermont not analyzed on a county basis.

traveling outside the State. This is not true for travel outside the county as shown in table 12, nor is the percentage of cars traveling outside the counties of residence in Nevada as great as the percentage of cars traveling outside the State. Travel outside the county refers only to travel in other Nevada counties so that a passenger car might be driven from Washoe County into California but not driven into any other counties in Nevada during the year. The Nevada data, and those for most other States also, are therefore a measure of use of other road facilities in the State rather than entirely a measure of travel outside limited boundaries. It should be noted, however, that the Nevada State percentage is controlled in the case of table 12 by the travel of residents of unincorporated areas and those in places of 2,501 to 10,000 population because only in those two population groups are the percentages of those traveling outside the county of residence smaller than the percentages of those traveling outside Nevada.

Table 13 presents data on truck travel in other counties of the respective States. While the total for the 34 States shows that almost half the trucks traveled in other counties, as compared to 85.2 percent of the cars, the percentage exceeds 70 in Alabama, Colorado, Maryland, Montana, and Utah.

It is noted, however, that again the Western States of Arizona, Nevada, and New Mexico report relatively low percentages of their trucks traveling in other counties. Similar low percentages are reported in

TABLE 13.—Percentage of trucks traveling outside county of ownership¹

State	Unincorporated areas	Percentage of trucks owned in—						Total	
		Incorporated places having a population of—							
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more		
Alabama	83.2	87.3	95.3	92.1	76.0	59.7	67.0	80.8	
Arizona	32.3	45.0	44.6	20.7	—	31.2	—	31.7	
Arkansas	64.8	71.8	64.9	65.0	38.7	44.3	—	61.6	
Colorado	72.4	77.1	79.5	78.9	57.5	62.5	74.8	72.8	
Florida	50.3	58.0	62.9	45.1	29.5	18.4	35.4	42.6	
Idaho	64.8	79.0	68.9	70.2	79.6	—	—	69.1	
Illinois	54.3	60.8	51.4	38.8	30.5	27.2	8.4	31.4	
Indiana	53.9	65.7	57.9	50.5	37.2	33.3	22.3	44.0	
Iowa	52.7	63.9	67.5	52.9	45.0	23.4	31.3	47.3	
Kansas	56.5	62.0	51.6	37.5	42.7	31.4	43.8	47.7	
Kentucky	72.0	86.5	68.7	69.1	41.2	47.9	18.1	61.4	
Louisiana	56.6	57.7	61.0	61.0	56.1	40.9	48.6	40.4	
Maryland	66.0	73.0	77.2	75.0	68.2	40.4	77.4	70.4	
Michigan	55.5	59.7	63.5	37.8	47.2	52.3	31.2	40.8	
Minnesota	56.7	68.3	64.2	53.7	35.2	—	45.6	54.1	
Missouri	66.1	66.3	66.3	57.7	59.6	34.6	23.9	45.7	
Montana	74.9	73.2	75.1	70.6	65.9	44.1	—	70.5	
Nebraska	47.5	68.4	69.7	50.9	52.0	31.9	24.3	50.5	
Nevada	37.7	16.2	51.4	32.9	24.0	—	—	30.0	
New Mexico	39.3	56.3	44.6	25.7	38.9	37.2	—	36.9	
New York	45.3	49.8	49.8	52.9	52.3	51.0	31.4	31.4	
North Dakota	52.7	79.9	59.3	72.5	49.7	37.5	—	57.6	
Ohio	63.7	71.6	71.0	58.2	54.2	47.7	34.5	50.7	
Oklahoma	63.2	63.2	62.2	60.1	75.3	66.0	43.1	62.1	
Oregon	62.7	65.2	60.8	61.5	52.9	86.4	43.6	58.8	
Pennsylvania	53.6	92.2	29.9	52.8	53.1	59.2	36.1	49.1	
South Dakota	51.7	54.1	64.2	52.5	49.1	59.1	—	53.9	
Texas	73.4	80.7	83.4	77.1	68.3	64.3	59.5	69.8	
Utah	79.8	84.5	80.6	70.0	74.1	74.3	55.7	74.0	
Virginia	65.3	67.2	64.4	79.6	70.7	57.1	53.7	63.3	
Washington	61.6	67.5	44.3	60.2	52.6	59.7	28.5	48.1	
West Virginia	71.1	80.3	74.7	55.4	57.5	64.0	—	66.8	
Wisconsin	48.6	65.3	51.7	53.1	54.9	35.0	18.5	46.3	
Wyoming	51.2	46.7	44.3	37.5	33.6	—	—	44.8	
Total	59.7	65.5	60.4	55.7	50.7	44.6	34.5	49.5	

¹ Travel outside the county refers only to travel in other counties in the State of ownership. Data for New Hampshire and Vermont not analyzed on a county basis.

Illinois, Michigan, and New York, where the travel of large numbers of trucks is limited to the metropolitan areas of Cook County in which Chicago is located, Wayne County, with Detroit, and the five counties or boroughs of New York City, all of which were classed as one county in the New York study.

The somewhat erratic percentages of truck travel in other counties as compared with car travel are undoubtedly more closely allied with the factors of shopping and marketing center locations. Size of the county, imposing geographic limitations on car travel, undoubtedly affects truck travel also but the economic factors involved in the operation of commercial vehicles are undoubtedly more significant in the case of trucks than in the case of cars.

OUT-OF-STATE TRAVEL A LOW PERCENTAGE OF TOTAL

As a further development of the data in tables 10 and 11 an analysis was also made of the percentage of the total vehicle-miles traveled by cars and trucks that occurred outside the State where the vehicle was registered. This information is shown in tables 14 and 15.

Although 43 percent of all cars and 14 percent of all trucks, according to the data shown in tables 10 and 11, make at least one trip outside the State of ownership during the period of a year, tables 14 and 15 indicate that the percentage of the total travel so accounted for is very much less. This, of course, is consistent with

other data obtained in the road-use surveys that show the small percentage of travel performed at any considerable distance from home.¹⁷

In the 36 States for which data are reported only 7.7 percent of all passenger-car travel and 5.5 percent of all truck travel was outside the respective State of ownership. The highest percentage of out-of-State travel for cars is found in New Mexico and Nevada, both Western States. High percentages of such travel are also found in the Eastern States of New Hampshire and Maryland whose State areas are restricted. Generally, with the exception of Washington and Oregon, out-of-State travel is a higher percentage of the total travel of car owners in most of the Western States than it is in the case of Eastern States. This can be observed in the case of Arizona, New Mexico, Nevada, Idaho, Utah, and Wyoming.

TABLE 14.—Percentage of total travel of passenger cars outside the State of ownership

State	Percentage of travel outside the State of cars owned in—								
	Unincorporated areas	Incorporated places having a population of—							
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more	Total	
Alabama	3.9	4.6	7.5	9.7	8.8	9.4	6.8	6.2	
Arizona	13.4	14.9	12.9	13.5	—	15.3	—	14.0	
Arkansas	13.9	11.8	11.8	13.4	12.4	12.6	—	13.1	
Colorado	5.1	10.0	12.9	8.3	11.2	7.5	8.5	8.3	
Florida	10.2	11.7	12.8	13.8	13.6	17.6	12.5	12.8	
Idaho	7.8	12.0	13.5	17.7	10.3	—	—	11.4	
Illinois	3.1	4.3	5.4	7.5	8.9	10.1	13.4	9.8	
Indiana	3.8	5.3	5.2	6.7	8.7	10.8	7.7	6.6	
Iowa	3.8	6.2	9.7	11.2	12.3	12.5	10.0	8.5	
Kansas	6.6	9.1	12.3	16.6	13.3	7.9	17.6	11.6	
Kentucky	5.3	4.1	9.6	9.5	10.4	15.7	8.8	7.9	
Louisiana	6.3	4.6	9.1	8.4	9.9	16.4	14.1	10.4	
Maryland	13.1	15.6	20.6	21.8	18.4	16.8	13.0	14.4	
Michigan	2.0	2.9	3.5	4.5	7.4	4.7	5.8	5.0	
Minnesota	2.3	4.5	4.2	5.9	4.9	—	5.1	4.3	
Missouri	2.8	4.4	4.4	4.3	4.6	5.4	6.4	11.2	
Montana	7.6	7.5	9.8	9.3	10.3	8.0	—	8.4	
Nebraska	3.5	7.1	10.3	11.4	7.1	7.2	9.0	6.9	
Nevada	13.9	11.7	21.8	17.3	15.5	—	—	15.9	
New Hampshire	—	10.0	11.7	13.5	19.1	13.4	—	13.5	
New Mexico	12.3	19.0	12.2	24.7	15.9	10.8	—	15.9	
New York	3.9	4.8	4.8	7.1	9.0	9.0	9.3	8.0	
North Dakota	4.4	9.0	15.2	10.7	16.1	29.5	—	9.1	
Ohio	2.5	4.7	5.9	7.6	6.6	7.5	8.3	6.4	
Oklahoma	5.8	5.9	6.4	6.2	6.9	6.9	9.4	6.9	
Oregon	6.4	7.6	9.3	8.8	8.0	8.2	13.1	9.5	
Pennsylvania	4.2	5.8	7.1	7.8	7.4	10.5	13.5	8.6	
South Dakota	6.2	11.9	14.3	14.3	13.4	16.3	—	10.8	
Texas	1.8	3.4	2.3	3.1	4.2	3.7	2.9	2.7	
Utah	7.8	6.9	9.4	10.2	9.7	14.5	15.8	11.8	
Vermont	7.2	9.5	4.9	12.2	8.0	—	—	8.1	
Virginia	5.8	9.7	8.2	6.9	14.5	5.4	6.4	6.6	
Washington	5.7	7.8	7.0	8.9	10.6	6.5	9.1	7.9	
West Virginia	4.7	10.4	10.7	13.5	18.0	13.2	—	9.9	
Wisconsin	2.8	4.5	6.6	4.3	8.5	7.8	6.2	5.6	
Wyoming	10.5	10.6	14.8	14.3	15.5	—	—	12.9	
Total	4.6	6.2	7.0	8.1	8.8	9.2	9.1	7.7	

When the States are studied individually it is also found that in two-thirds of them the percentage of total passenger-car travel that is out-of-State is smallest for the unincorporated areas. The exceptions occur generally for the smaller places. Out-of-State travel for cars in the 1,000 or less population group is smaller than similar travel for cars in unincorporated areas in Arkansas, Kentucky, Louisiana, Montana, Nevada, and Utah. Similar conditions exist for the 1,001 to 2,500 population group for Arizona, Arkansas, New Mexico,

¹⁷ Preliminary Results of Road Use Studies, by Robert H. Paddock and Roe P. Rodgers, PUBLIC ROADS, May 1939.

and Vermont, for the 2,501 to 10,000 and 10,001 to 25,000 population groups only for Arkansas; for the 25,001 to 100,000 population group for Arkansas, New Mexico, and Virginia, and for the 100,001 or more population group only for Maryland.

On the basis of the percentage of trucks traveling outside the State annually (table 13) the data in table 15 appear reasonable. A considerably smaller percentage of trucks than of cars travels outside the State annually; likewise, a considerably smaller percentage of the total travel of trucks is outside the State than is the case for cars.

Trucks owned in unincorporated areas traveled outside the State less than those of other population groups. However, there is less variation among the population groups than in the case of cars. It is also noteworthy that in only eight of the States was the lowest percentage

TABLE 15.—Percentage of total travel of trucks outside the State of ownership

State	Percentage of travel outside the State of trucks owned in—								
	Unincorporated areas	Incorporated places having a population of—							
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more	Total	
Alabama	6.0	5.9	9.6	6.1	5.9	7.1	6.9	6.5	
Arizona	7.0	2.7	2.9	7.1	—	29.2	—	—	16.1
Arkansas	15.8	19.5	11.4	8.9	17.8	27.9	—	—	16.3
Colorado	4.3	5.2	1.2	1.1	8.8	2.2	14.5	6.7	
Florida	5.0	9.1	5.5	6.8	3.7	4.5	5.8	5.6	
Idaho	7.2	48.0	10.3	12.1	20.8	—	—	—	16.9
Illinois	2.8	2.0	1.0	1.9	.4	2.7	7.1	4.0	
Indiana	6.4	7.0	5.5	8.1	10.5	9.4	10.6	8.4	
Iowa	3.0	10.7	3.7	5.1	6.8	7.1	.9	5.9	
Kansas	3.9	3.0	7.5	10.4	3.9	.7	12.3	5.8	
Kentucky	5.2	8.4	4.9	6.0	5.8	8.1	9.6	6.3	
Louisiana	3.5	.9	3.7	1.6	5.8	15.8	5.0	4.9	
Maryland	16.4	18.5	19.7	24.3	20.9	19.7	8.1	14.2	
Michigan	2.1	2.1	3.4	3.5	4.9	2.4	3.6	3.2	
Minnesota	1.2	2.7	3.2	4.1	2.1	—	3.5	2.5	
Missouri	2.6	7.1	7.1	1.0	3.3	4.6	12.7	6.9	
Montana	3.9	4.0	6.0	5.2	1.9	1.9	—	3.7	
Nebraska	5.4	13.0	12.0	15.2	11.3	11.8	9.0	11.0	
Nevada	14.0	—	37.8	14.9	2.8	—	—	16.4	
New Hampshire	—	5.8	11.9	10.6	19.0	13.5	—	12.3	
New Mexico	8.2	9.5	10.9	14.8	8.7	4.1	—	9.8	
New York	4.1	2.5	2.5	3.3	2.4	2.8	6.8	5.0	
North Dakota	1.9	2.6	3.5	4.2	4.5	18.5	—	4.2	
Ohio	3.5	2.9	3.3	4.6	4.7	6.4	5.5	4.8	
Oklahoma	3.0	3.0	3.3	2.6	3.4	4.7	1.9	2.8	
Oregon	5.0	7.8	6.9	7.8	10.9	3.2	8.4	6.9	
Pennsylvania	5.5	9.7	7.4	5.3	5.9	8.5	7.7	6.8	
South Dakota	5.0	9.4	11.9	6.2	11.6	7.7	—	8.5	
Texas	1.2	1.3	.8	1.5	1.8	2.3	1.1	1.4	
Utah	6.7	6.4	7.0	6.3	7.3	7.9	9.1	7.4	
Vermont	12.9	1.2	5.2	9.2	21.8	—	—	12.5	
Virginia	1.3	2.7	9.3	.9	2.3	.2	3.7	3.6	
Washington	3.3	3.3	2.7	4.0	6.0	—	—	7.7	
West Virginia	4.6	2.5	9.2	9.4	10.9	10.5	—	7.7	
Wisconsin	1.3	4.1	2.8	1.7	5.4	3.5	1.6	2.5	
Wyoming	12.0	10.4	7.8	14.5	16.9	—	—	12.2	
Total	4.3	6.6	4.6	5.0	5.6	6.3	6.2	5.5	

of out-of-State travel performed by trucks owned in unincorporated areas. This is entirely different from the tendency noted in car travel.

In another respect the travel of cars and trucks is strikingly similar. In both cases, in 13 of the 36 States the highest percentage of out-of-State travel was reported for cars and trucks owned in the largest population group. In the case of cars in 10 other States the highest percentage for out-of-State travel was in the next to the largest population group; this condition held for trucks in 6 States.

SUMMARY

The data presented in this report indicate generally certain travel characteristics of passenger car and truck owners in the several States.

A small percentage of the total travel of all trucks is for other than business or commercial purposes. For the States for which such data are available only 2.5 percent of all truck travel was for other than business or commercial purposes.

More than half, or 56.7 percent, of all passenger-car travel in 31 States was for business purposes, and this travel combined with the travel by trucks indicates that approximately 65 percent of all motor-vehicle travel is for business purposes.

A classification of pleasure travel into social and recreational travel indicates that, although the percentages vary from State to State, pleasure travel is divided approximately equally between social and recreational travel.

Although older cars travel fewer miles each year and make shorter trips, a higher percentage of their total travel is for business purposes than is the case for the newer cars.

Cars and trucks owned in unincorporated areas make a smaller percentage of trips outside the State where they are owned, are used to visit fewer other counties in the State of ownership, and perform a smaller percentage of their total travel outside the State of ownership than do the cars and trucks of any other population group.

In the 36 States studied 42.8 percent of the cars but only 14.0 percent of the trucks traveled outside the State of ownership during the year.

In 34 States, almost 15 percent of the cars and 50.5

percent of the trucks did not travel into other counties or the State of ownership during the year studied.

In 36 States included in the study, 7.7 percent of the total travel of the passenger cars and 5.5 percent of the total travel of trucks was performed outside the State of registration.

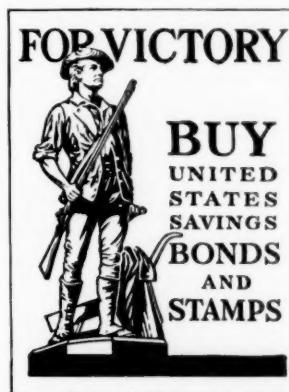
Generally, the extent of travel including the percentage of vehicles traveling outside the county and State of registration, and the percentage of total travel performed outside the State, increase as the size of the population group increases.

PUBLICATION REPORTS RESEARCH ON FLEXIBLE PIPE CULVERTS

The first rational analysis ever made of the behavior of flexible types of culvert pipe, based on accepted principles of mechanics, has recently been published as Bulletin No. 153 of the Iowa Engineering Experiment Station. This bulletin, *The Structural Design of Flexible Pipe Culverts*, by M. G. Spangler, reports the results of a joint investigation by the Public Roads Administration and the Iowa Engineering Experiment Station.

The study reveals that the thin-ring elastic analysis is valid for calculation of deflections of corrugated metal pipe. This analysis is used as a basis for deriving a design formula for pipe deflection which evaluates the effect of fill load, pipe size, bedding, properties of the soil, moment of inertia of the pipe wall, modulus of elasticity of the metal, and time of service.

Single copies of this 80-page bulletin may be obtained without charge from the Iowa Engineering Experiment Station, Ames, Iowa.



STATUS OF FEDERAL-AID HIGHWAY PROJECTS

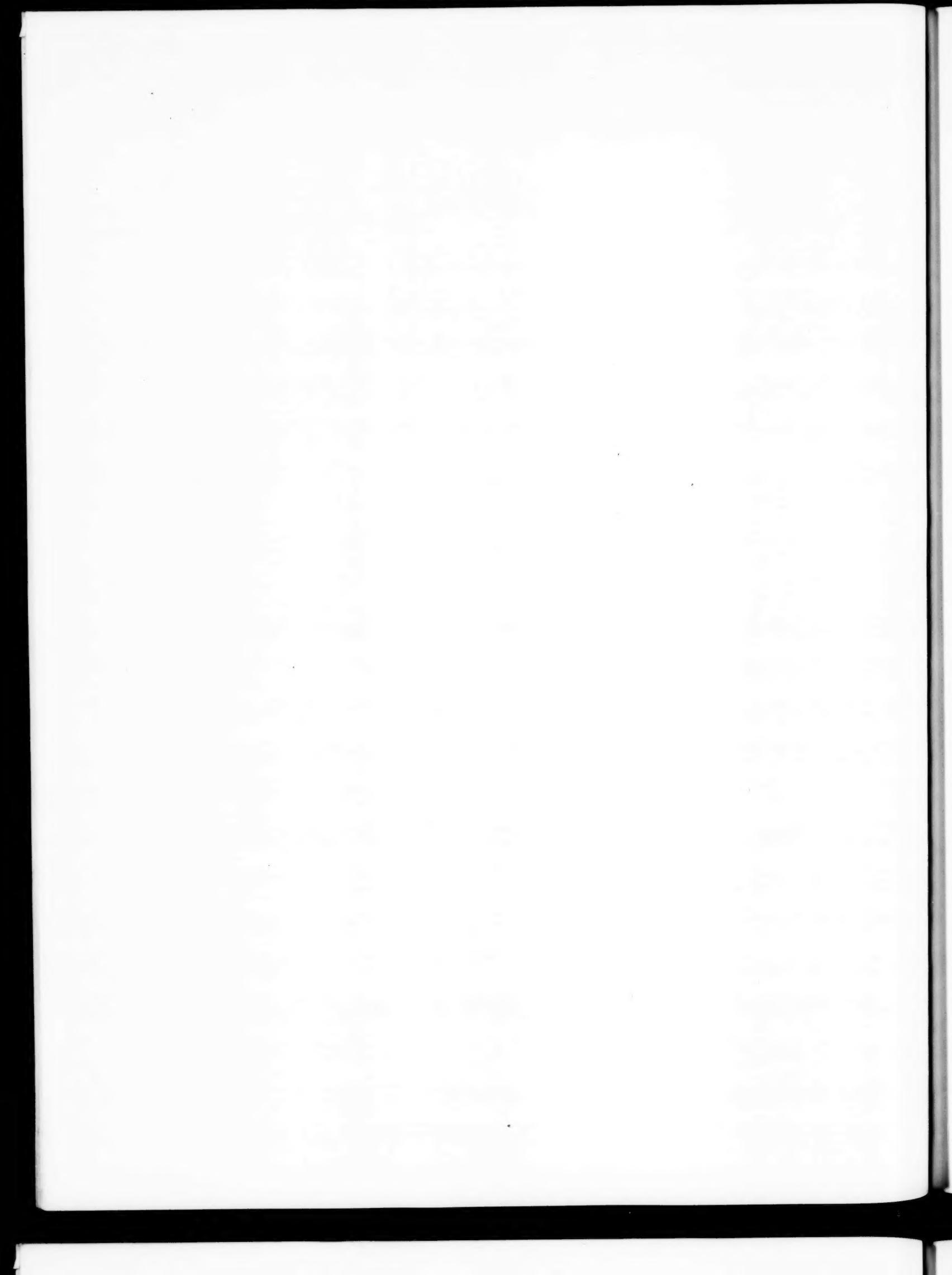
AS OF MARCH 31, 1942

STATE	COMPLETED DURING CURRENT FISCAL YEAR			UNDER CONSTRUCTION			APPROVED FOR CONSTRUCTION			BALANCE OF FUNDS AVAILABLE FOR PRO-GRANDED PRO- JECTS
	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	
Alabama	\$6,456,558	\$3,207,060	228.2	\$4,053,534	\$2,134,580	115.2	\$415,400	\$206,050	0.3	\$2,622,386
Arizona	1,681,133	1,181,967	68.1	1,138,071	835,693	40.5	384,302	184,319	8.4	1,993,612
Arkansas	3,634,317	1,665,856	57.4	1,173,174	585,470	60.1	152,496	98,196	0.5	1,722,574
California	6,938,376	4,823,259	149.3	5,016,942	3,321,268	56.3	472,203	307,723	14.3	4,464,555
Colorado	2,291,094	1,278,286	194.6	5,618,70	2,555,799	155.6	1,165,565	652,450	41.1	2,191,380
Connecticut	1,419,554	696,181	17.1	1,715,156	821,787	18.4	481,85	239,471	9.4	1,228,870
Delaware	666,588	207,972	17.1	441,010	216,559	9.0	268,040	134,020	8.4	1,468,572
Florida	1,392,189	695,897	66.7	3,131,576	1,753,655	49.2	512,242	293,621	4.6	3,031,766
Georgia	2,994,295	1,495,854	111.4	7,399,882	3,709,691	281.9	2,914,244	1,457,222	122.2	7,032,215
Idaho	1,612,907	1,162,907	93.7	1,283,694	917,647	63.1	58,244	36,000	0.1	1,982,623
Illinois	4,129,995	2,014,092	89.7	7,053,216	3,564,536	121.7	1,361,200	680,600	6.2	7,107,345
Indiana	6,621,226	2,127,135	75.1	6,721,339	3,207,394	92.8	800,300	400,150	14.3	2,895,930
Iowa	3,903,246	1,887,215	170.6	4,348,332	1,758,282	130.2	493,917	213,450	13.1	2,533,968
Kansas	4,676,783	2,317,589	263.2	6,127,089	3,223,190	253.4	997,444	442,150	4.9	4,804,199
Kentucky	4,004,448	2,002,298	146.9	6,150,960	2,932,510	118.8	2,004,624	935,397	2.0	4,024,821
Louisiana	1,514,168	801,891	31.5	1,382,924	914,501	28.5	2,553,917	1,251,767	56.3	4,265,037
Maine	948,788	469,405	26.8	2,070,392	1,061,696	27.8	78,610	39,305	0.1	1,125,122
Maryland	2,765,267	1,381,529	29.6	3,446,909	1,466,154	15.0	35,000	15,500	1.1	1,537,207
Massachusetts	2,351,682	1,176,512	17.3	2,239,503	1,159,262	14.9	1,273,400	658,873	9.1	3,817,721
Michigan	8,461,297	4,225,312	174.2	2,919,748	1,891,824	50.6	976,500	561,825	9.5	3,295,032
Minnesota	4,463,072	2,183,470	378.0	9,522,463	4,717,659	388.9	360,358	180,179	19.6	3,516,916
Mississippi	5,326,567	2,602,918	253.3	3,744,324	1,874,762	288.1	21,400	13,700	1.3	3,306,444
Missouri	5,059,170	2,580,179	160.1	10,772,229	5,955,231	193.2	1,888,556	630,413	24.8	4,223,049
Montana	2,181,671	1,259,332	117.1	4,026,424	2,350,912	173.9	387,977	182,823	55.2	4,451,157
Nebraska	2,921,742	1,430,733	217.8	5,228,396	2,629,155	475.7	82,976	41,488	10.9	4,094,994
Nevada	2,233,884	1,910,826	110.6	742,339	643,031	22.0	297,496	257,831	3.4	1,401,980
New Hampshire	316,013	189,086	6.0	1,100,559	1,022,873	20.2	1,022,873	1,022,873	0.0	831,346
New Jersey	2,985,618	1,466,835	26.6	2,988,902	1,494,371	16.2	1,494,371	1,494,371	0.0	3,015,346
New Mexico	1,629,712	1,018,116	112.8	1,098,866	778,892	63.2	778,892	778,892	0.0	2,885,765
New York	9,592,156	4,920,744	126.7	7,932,755	5,062,640	80.6	1,035,400	620,300	12.5	5,386,477
North Carolina	4,004,928	2,112,295	162.8	2,918,474	1,596,539	123.5	575,070	287,535	8.8	3,663,261
North Dakota	3,221,569	1,882,679	287.6	2,566,134	1,551,752	203.9	2,448,625	1,279,999	205.5	4,006,811
Ohio	10,008,286	5,303,101	97.9	11,204,292	6,139,043	75.3	5,385,210	2,202,043	25.0	3,212,120
Oklahoma	2,505,159	1,267,267	113.8	2,530,422	1,353,270	51.6	1,694,180	896,004	60.2	6,252,003
Oregon	2,783,897	1,644,626	73.0	5,200,754	1,699,318	71.4	662,730	503,480	36.2	1,408,120
Pennsylvania	10,820,733	4,992,380	109.5	10,764	5,304,962	78.6	1,442,024	902,224	30.8	4,393,357
Rhode Island	1,166,895	596,429	10.0	644,776	322,368	4.8	644,448	322,224	2.0	645,132
South Carolina	2,190,404	1,055,179	92.1	3,977,759	2,191,452	93.7	711,490	430,100	16.3	1,467,885
South Dakota	2,202,437	1,315,959	218.6	4,864,023	3,202,055	942.5	545,110	320,580	59.3	2,880,650
Tennessee	11,542,829	5,636,357	510.5	5,060,450	2,999,979	103.1	2,999,979	1,231,611	142,646	3,481,260
Utah	1,266,046	907,446	53.8	1,885,271	1,428,236	46.7	1,885,271	1,885,271	64.2	9,529,623
Vermont	619,207	446,606	28.8	1,195,762	716,441	20.7	36,906	13,453	3.4	1,253,842
Virginia	3,911,667	1,839,999	74.7	5,210,798	1,731,556	57.3	35,490	11,745	2,891,214	
Washington	1,665,128	897,956	25.7	2,605,052	1,408,891	31.5	43,686	23,400	1.0	2,207,228
West Virginia	2,266,115	1,312,978	51.4	2,482,738	1,231,611	29.3	338,900	166,750	1.8	2,206,248
Wisconsin	2,205,117	1,114,556	92.7	5,618,496	3,567,693	163.9	1,253,842	4,282,529	4,282,529	1,313,397
Wyoming	1,404,138	954,140	148.3	1,807,737	1,339,888	123.6	227,782	135,272	217,454	1,506,323
District of Columbia	1,012,296	66,648	3.5	1,078,293	792,216	10.9	378,475	359,003	4.3	1,574,165
Hawaii	133,296	238,835	3.9	2,136,655	1,056,215	18.0	415,525	255,599	3.5	1,606,323
Puerto Rico	1,931,255	90,835	5,966.4	199,943,990	109,618,807	5,972.8	39,139,749	20,098,685	1,035.7	151,687,597
TOTALS	174,932,930	90,835,027	5,966.4	199,943,990	109,618,807	5,972.8	39,139,749	20,098,685	1,035.7	151,687,597

STATUS OF FEDERAL-AID SECONDARY OR FEEDER ROAD PROJECTS

AS OF MARCH 31, 1942

STATE	COMPLETED DURING CURRENT FISCAL YEAR			UNDER CONSTRUCTION			APPROVED FOR CONSTRUCTION			BALANCE OF FUNDS AVAILABLE FOR PROJ- ECTS
	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	
Alabama	\$1,352,972	\$695,108	62.5	\$519,982	\$285,130	25.2	\$206,701	\$96,830	6.0	\$581,400
Arizona	15,110	174,247	14.1	15,183	13,767	26.5	129,775	65,749	6.8	346,644
Arkansas	633,246	237,999	33.1	483,854	241,861					335,599
California	1,014,242	614,134	18.3	756,159	580,393	7.6	152,387	35,323	5.0	1,046,299
Colorado	157,106	82,891	20.7	184,366	103,592	3.4				501,761
Connecticut	298,025	136,221	6.1	266,247	115,938	4.8				129,604
Delaware	81,076	38,216	224,223	111,986	12.3	102,873	37,618	3.9	246,037	
Florida	1,092,471	519,285	11.6	292,018	153,304	6.1	400,257	200,129	43.7	1,125,116
Georgia	515,666	271,833	43.4	1,205,213	694,937	74.9				285,992
Idaho	293,947	172,516	26.2	225,220	151,021	7.7	36,149	21,587	2.8	
Illinois	1,087,098	518,844	59.4	1,147,660	573,830	54.5	96,500	48,250	10.6	903,476
Indiana	524,207	291,074	32.8	1,128,155	531,071	46.7	189,600	91,890	6.4	941,393
Iowa	638,766	296,061	165.0	414,792	183,645	57.1	287,449	133,725	51.5	589,321
Kansas	806,405	404,547	106.4	1,615,909	813,454	90.5	460,565	230,282	36.9	1,039,669
Kentucky	1,157,864	321,129	83.2	1,299,010	417,668	37.2	74,213	21,400	5.6	324,311
Louisiana	538,442	265,678	20.6	7,700	3,890	289,362	138,761	21.5	666,649	
Maine	77,240	38,770	3.6	235,218	117,609	10.6	16,850	2,714	.4	161,416
Maryland	519,966	289,806	20.7	226,310	113,205	1.8				245,564
Massachusetts	179,189	93,569	4.1	688,233	377,683	10.1	315,970	157,985	11.2	547,304
Michigan	1,529,661	599,924	76.3	786,598	393,299	24.8	300,776	149,988	30.1	639,267
Minnesota	829,115	797,479	217.1	990,917	501,197	86.9				590,305
Mississippi	435,434	414,858	46.5	1,444,046	670,888	59.0	229,150	84,646	36.7	1,053,332
Missouri	377,420	214,924	58.2	873,976	419,400	43.9	113,590	51,500	21.5	689,999
Montana	361,584	178,543	49.4	292,724	170,122	31.0				231,959
Nebraska	324,082	265,067	28.6	483,813	244,520	64.7	10,141	5,070	2.0	425,220
New Hampshire	156,054	95,143	4.7	239,437	118,819	3.6				133,643
New Jersey	487,496	239,245	9.6	412,615	230,410	12.1	51,500	25,750	1.8	571,787
New Mexico	956,935	357,245	17.7	189,504	122,533	15.2				296,856
New York	959,697	369,927	28.8	1,135,012	608,144	14.9	245,600	122,800	.9	1,096,021
North Carolina	339,015	178,344	34.9	522,407	278,748	36.2	69,820	20,000	5.0	687,399
North Dakota	29,802	15,664	2.4	7,382	7,382	14.5	808,050	793,850	42.7	755,112
Ohio	1,785,007	889,427	57.6	901,610	498,775	201,425	76,000	18,000	2.0	1,373,991
Oklahoma	400,250	210,874	27.6	27,872	14,715	4.0	1,260,706	669,688	75.9	899,506
Oregon	459,181	244,030	41.8	482,318	255,794	28.5	30,482	18,000	1.3	366,285
Pennsylvania	2,016,130	996,936	37.6	513,989	256,387	10.4	213,588	36,794	1.8	766,738
Rhode Island	220,879	111,427	2.6	22,194	18,197					130,911
South Carolina	787,356	307,866	54.6	221,700	79,945	.5				397,720
South Dakota	36,665	22,152	15.2	4,156	4,156					762,018
Tennessee	1,439,323	232,400	14.1	1,337,954	668,977	46.0	1,143,430	1,047,600	114.5	
Texas	1,186,949	123,241	17.0	153,068	101,109	48.9	1,58,042	79,021	4.5	313,033
Utah	40,708	18,109	1.2	180,204	85,995	7.8	42,311	31,733	1.1	5,580
Vermont	406,206	191,396	16.2	346,766	155,305	4.5	25,150	12,575	3.9	676,811
Virginia	293,361	170,221	11.8	140,346	201,425	12.7				413,564
Washington	427,292	215,822	19.8	301,364	150,069	6.4				501,897
West Virginia	936,033	464,993	42.7	1,421,925	655,289	46.0	51,562	24,880	.8	596,353
Wyoming	355,621	158,026	18.8	308,423	218,112					220,933
District of Columbia	76,620	31,756	.9	2,558	1,279					16,600
Hawaii				2,375	2,375					334,875
Puerto Rico	170,027	77,541	7.5	73,245	38,810	3.1				217,938
TOTALS	29,551,971	14,660,801	1,935.4	25,918,830	13,113,100	1,195.2	7,394,028	4,473,973	546.6	30,089,846



PUBLICATIONS of the PUBLIC ROADS ADMINISTRATION

Any of the following publications may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. As his office is not connected with the Agency and as the Agency does not sell publications, please send no remittance to the Federal Works Agency.

ANNUAL REPORTS

Report of the Chief of the Bureau of Public Roads, 1931. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1932. 5 cents.
Report of the Chief of the Bureau of Public Roads, 1933. 5 cents.
Report of the Chief of the Bureau of Public Roads, 1934. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1935. 5 cents.
Report of the Chief of the Bureau of Public Roads, 1936. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1937. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1938. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1939. 10 cents.
Work of the Public Roads Administration, 1940.
Work of the Public Roads Administration, 1941.

HOUSE DOCUMENT NO. 462

Part 1 . . . Nonuniformity of State Motor-Vehicle Traffic Laws. 15 cents.
Part 2 . . . Skilled Investigation at the Scene of the Accident Needed to Develop Causes. 10 cents.
Part 3 . . . Inadequacy of State Motor-Vehicle Accident Reporting. 10 cents.
Part 4 . . . Official Inspection of Vehicles. 10 cents.
Part 5 . . . Case Histories of Fatal Highway Accidents. 10 cents.
Part 6 . . . The Accident-Prone Driver. 10 cents.

MISCELLANEOUS PUBLICATIONS

No. 76MP . . . The Results of Physical Tests of Read-Building Rock. 25 cents.
No. 191MP . . . Roadside Improvement. 10 cents.
No. 272MP . . . Construction of Private Driveways. 10 cents.
No. 279MP . . . Bibliography on Highway Lighting. 5 cents.
Highway Accidents. 10 cents.
The Taxation of Motor Vehicles in 1932. 35 cents.
Guides to Traffic Safety. 10 cents.
An Economic and Statistical Analysis of Highway-Construction Expenditures. 15 cents.
Highway Bond Calculations. 10 cents.
Transition Curves for Highways. 60 cents.
Highways of History. 25 cents.
Specifications for Construction of Roads and Bridges in National Forests and National Parks. 1 dollar.

DEPARTMENT BULLETINS

No. 1279D . . . Rural Highway Mileage, Income, and Expenditures, 1921 and 1922. 15 cents.
No. 1486D . . . Highway Bridge Location. 15 cents.

TECHNICAL BULLETINS

No. 55T . . . Highway Bridge Surveys. 20 cents.
No. 265T . . . Electrical Equipment on Movable Bridges. 35 cents.

Single copies of the following publications may be obtained from the Public Roads Administration upon request. They cannot be purchased from the Superintendent of Documents.

MISCELLANEOUS PUBLICATIONS

No. 296MP . . . Bibliography on Highway Safety.
House Document No. 272 . . . Toll Roads and Free Roads.
Indexes to PUBLIC ROADS, volumes 6-8 and 10-21, inclusive.

SEPARATE REPRINT FROM THE YEARBOOK

No. 1036Y . . . Road Work on Farm Outlets Needs Skill and Right Equipment.

REPORTS IN COOPERATION WITH UNIVERSITY OF ILLINOIS

No. 303 . . . Solutions for Certain Rectangular Slabs Continuous Over Flexible Support.
No. 304 . . . A Distribution Procedure for the Analysis of Slabs Continuous Over Flexible Beams.
No. 313 . . . Tests of Plaster-Model Slabs Subjected to Concentrated Loads.
No. 314 . . . Tests of Reinforced Concrete Slabs Subjected to Concentrated Loads.
No. 315 . . . Moments in Simple Span Bridge Slabs With Stiffened Edges.

UNIFORM VEHICLE CODE

Act I.—Uniform Motor Vehicle Administration, Registration, Certificate of Title, and Antitheft Act.
Act II.—Uniform Motor Vehicle Operators' and Chauffeurs' License Act.
Act III.—Uniform Motor Vehicle Civil Liability Act.
Act IV.—Uniform Motor Vehicle Safety Responsibility Act.
Act V.—Uniform Act Regulating Traffic on Highways.
Model Traffic Ordinances.

A complete list of the publications of the Public Roads Administration, classified according to subject and including the more important articles in PUBLIC ROADS, may be obtained upon request addressed to Public Roads Administration, Willard Bldg., Washington, D. C.

STATUS OF FEDERAL-AID GRADE CROSSING PROJECTS

AS OF MARCH 31, 1942

STATE	COMPLETED DURING CURRENT FISCAL YEAR				UNDER CONSTRUCTION				APPROVED FOR CONSTRUCTION				
	Estimated Total Cost	Federal Aid	NUMBER		Estimated Total Cost	Federal Aid	NUMBER		Estimated Total Cost	Federal Aid	NUMBER		
			Grade Crossings Completed and Estimated Cost of Relocation	Grade Crossings Completed and Estimated Cost of Relocation			Grade Crossings Completed and Estimated Cost of Relocation	Grade Crossings Completed and Estimated Cost of Relocation			Grade Crossings Completed and Estimated Cost of Relocation	Grade Crossings Completed and Estimated Cost of Relocation	
Alabama	\$151,956	\$151,436	2	4	\$390,025	\$36,803	5	2	\$80,935	\$60,935	3	5	
Arizona	164,378	130,561	1	1	125,274	116,583	1	2	13,255	13,255	2	2	
Arkansas	471,125	469,820	5	7	171,446	159,536	1	2	12,559	12,559	4	4	
California	816,454	640,882	2	1	5	870,516	868,999	8	9,914	9,914	3	3	
Colorado	5,685	5,646	1	1	664,333	654,333	7	1	21,042	21,042	10	10	
Connecticut	166,222	165,415	2	1	61,112	60,616	1	1	231,274	222,740	1	1	
Delaware	89,125	89,125	1	1	191,999	189,667	1	1	508,406	321,785	2	2	
Florida	120,961	120,961	20	20	843,067	840,887	8	6	82,492	82,432	14	14	
Georgia	668,929	668,929	7	2	6	840,130	840,130	5	10	921,109	921,109	4	4
Idaho	27,850	23,603	3	3	322,273	313,602	4	1	4,189	4,189	2	2	
Illinois	666,580	564,611	2	2	84	1,667,042	1,572,807	8	1	412,199	393,249	1	1
Indiana	601,383	601,383	6	26	471,234	465,525	2	17	79,950	79,950	23	23	
Iowa	350,562	340,272	3	1	28	1,444,138	1,192,530	10	2	191,014	183,990	45	45
Kansas	69,711	69,706	2	2	7	756,728	756,728	9	4	135,254	131,170	3	3
Kentucky	1,109,173	1,107,599	9	1	441,211	441,211	1	1	481,835	480,667	4	4	
Louisiana	6,965	6,965	1	1	586,220	586,220	8	1	7,739	7,739	3	3	
Maine	400,900	459,107	2	2	11	817,591	817,591	2	1	37,325	37,325	7	7
Maryland	316,270	335,823	1	1	791,442	790,770	5	2	763,590	763,590	2	2	
Massachusetts	1,321,793	1,314,906	3	4	22	249,321	249,321	1	4	329,229	299,668	1	1
Michigan	638,127	638,112	5	4	10	968,896	968,896	5	4	59,688	59,688	1	1
Minnesota	253,874	255,874	2	1	10	843,110	843,110	10	4	22,808	22,808	2	2
Mississippi	120,702	120,702	2	2	1,970,583	1,514,663	1,514,663	6	2	416,991	416,991	2	2
Missouri	141,549	141,549	2	2	2	99,778	99,778	1	1	416,991	416,991	2	2
Montana	119,203	118,161	2	2	22	1,142,413	1,142,413	21	1	13,020	13,020	3	3
Nebraska	119,382	116,832	2	1	1	57,946	57,946	2	1	28,124	28,124	9	9
New Hampshire	265,368	265,069	4	1	3	96,240	96,240	2	1	403,460	199,130	1	1
New Jersey	832,812	850,349	4	1	2	622,904	497,154	3	1	354,985	295,560	1	1
New Mexico	2,422,733	2,364,650	2	13	1,962,196	1,923,057	3	8	259,103	252,668	3	3	
New York	518,515	513,515	2	5	23	195,211	192,333	2	7	133,998	133,998	1	1
North Carolina	114,102	112,699	2	2	22	585,615	585,615	6	7	1,407,381	1,407,381	473,945	473,945
Ohio	1,545,117	1,529,900	8	1	7	2,780,072	2,456,150	10	2	403,460	199,130	1	1
Oklahoma	193,054	189,260	1	2	34	938,159	934,749	7	3	372,820	334,783	3	3
Oregon	419,536	352,255	4	3	3	68,342	68,342	1	1	10,433	10,433	3	3
Pennsylvania	1,907,614	1,876,905	14	1	3,016,940	3,002,311	14	14	502,645	464,285	1	1	
Rhode Island	205,241	205,241	1	1	3	3,655	3,655	1	1	359,074	359,074	2	2
South Dakota	341,464	328,115	6	21	245,569	226,128	2	3	238,858	123,735	1	1	
South Dakota	511,904	511,793	13	9	515,221	499,871	9	2	41,200	41,200	2	2	
Tennessee	301,580	289,086	3	3	1,325,647	1,325,647	7	1	102,106	102,106	1	1	
Texas	1,359,036	1,309,617	16	16	1,361,837	1,350,293	13	4	4,350	4,350	1	1	
Utah	61,459	61,117	2	20	66,304	66,304	1	8	60,140	60,140	23	23	
Vermont	18,683	18,671	4	4	322,869	293,990	2	1	1,037,361	1,037,361	103,978	103,978	
Virginia	516,966	516,966	2	4	392,327	372,367	5	1	4,015	4,015	1	1	
Washington	119,205	118,556	1	2	1,250,182	551,508	7	5	51,192	51,192	2	2	
West Virginia	237,143	237,143	3	6	654,710	654,520	6	1	15,484	15,484	1	1	
Wisconsin	468,542	451,282	39	39	568,623	567,635	3	2	15,484	15,484	6,416	6,416	
Wyoming	481,271	466,615	6	39	1,974	1,974	1	6	8,417	8,417	6	6	
District of Columbia	2,913	2,913	2	1	299,075	275,206	1	1	10,355	10,355	10,355	10,355	
Hawaii	187,618	187,618	2	2	214,170	213,655	2	1	282,756	282,756	163,914	163,914	
Puerto Rico	103,629	102,980	1	1	780,618	772,706	11	11	4,383	3,351,950	7,763,801	4,383	
TOTALS	22,427,344	21,782,762	161	54	35,689,623	33,351,950	253	46	116	7,763,801	7,044,578	35	
												278	
												48,508,209	